ZyWAN

User Manual

EuroTech Ltd

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Revision History

Manual	*PCB*	*Date*	*Comments*
Issue A		June 2007	First full release of User Manual.
Issue B		1st October 2007	Eurotech rebranding.

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For contact details, see page 73.

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About this manual

This manual provides detailed information about the ZyWAN Cellular Routing Modem.

Symbols

The following symbols are used in this guide:

Symbol	Explanation
	Information that requires your attention.
	A handy hint that may provide a useful alternative or save time.
	Proceeding with a course of action may damage your equipment or result in loss of data.

Safety and regulatory information

Users must observe the safety precautions and regulatory guidelines outlined in this manual, as well as good technical judgment, whenever this product is installed or used.

Product handling and environmental guidelines

Electric current from power and communication cables is hazardous. To avoid shock hazard when connecting or disconnecting cables, follow appropriate safety precautions. Ensure that the correct operating voltage is used when powering the device.

Do not open the equipment to perform any adjustments, measurements or maintenance until all power supplies have been disconnected.

The ZyWAN is equipped with a certain level of protection against power surges. However, to ensure maximum protection, or when using in areas susceptible to electrical disturbances and lightning, use of an external surge suppressor is strongly recommended.

Anti-static handling

The ZyWAN includes a circuit board which contains CMOS devices that could be damaged in the event of static electricity discharged through them. At all times, please observe anti-static precautions when handling the product.

Batteries

The ZyWAN contains a coin-type replaceable Lithium battery to maintain its real-time clock when input power is removed. During shipment the battery is disconnected and should be connected before using the board, or else the real-time clock will be reset on loss of power. Please refer to the link section of this manual for details.

To avoid possible injury or death:

- Do not short circuit the batteries or place in water or on a metal surface where the battery terminals could be shorted. Do not incinerate or heat to more than 100 °C (212 °F). Do not crush or otherwise disassemble the battery, or attempt to repair the battery.
- Do not recharge. The batteries are non-rechargeable. There is a danger of explosion if a lithium battery is recharged or incorrectly replaced.
- Dispose of used batteries according to the manufacturer’s instructions and local ordinances.

Packaging

Should a product need to be returned to Eurotech Ltd, please ensure that it is adequately packed, preferably in the original packing material. If the original packing material is not available, return the product in an anti-static bag contained within a box that provides suitable physical protection.

RoHS Compliance

The European RoHS Directive (Restriction on the Use of Certain Hazardous Substances - Directive 2002/95/EC) limits the amount of six specific substances within the composition of the product. The ZyWAN and associated accessory products are available as RoHS-6 compliant. A full RoHS Compliance Materials Declaration Form is available upon request. Further information about RoHS compliance is available on the Eurotech Ltd Web site at www.eurotech-ltd.co.uk/RoHS_and_WEEE.

Radio frequency requirements

This device complies with Part 15 of FCC Rules. Operation is subject to the following conditions:

1. This device may not cause harmful interference.
2. This device must accept any interference received, including interference that may cause undesired operation.
3. To comply with RF safety requirements, you must maintain a distance of 20 cm from the antenna when operating the device.
4. Each antenna of this device must not be co-located with (within 20 cm of) any other antenna or transmitter. Antenna requirements are listed in the FCC grant information for each module, below.

Electromagnetic Compatibility (EMC)

The ZyWAN is classified as a component with regard to the European Community EMC regulations and it is the user's responsibility to ensure that systems using the product are compliant with the appropriate EMC standards.

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules and European Community EMC regulations. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one of the following measures:

1. Reorient or relocate the receiving antenna.
2. Increase the separation between the equipment and receiver.
3. Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
4. Consult the dealer or an experienced radio/TV technician for help.

Radio frequency standards for ZyWAN-GPRS

FCC ID: UFNZEUSGR64

FCC grant information: This device is approved for mobile RF exposure conditions. Approved for use with antenna(s) as listed in this filing. The antenna(s) used for this transmitter must be installed to provide a separation distance of at least 20 cm from all persons and must not be co-located or operating in conjunction with any other antenna or transmitter.

Radio frequency standards for ZyWAN-IDEN

FCC ID: UFNZEUSIO270

FCC grant information: Products operating with this OEM module must not exceed 2.54 W EIRP total system output with antenna gain not exceeding 7.3 dBi. The antenna must operate at 20 cm or more from persons. This module is not approved for use in any products operating as a portable transmitter with respect to 2.1093 or other mobile operating conditions that do not meet categorical exclusion requirements of 2.1091, which requires separate approval.

Radio frequency standards for ZyWAN-EVDO

FCC ID: UFNZEUSMC5725

FCC grant information: Modular Approval for use as a module in mobile-only exposure conditions, antenna gain including cable loss must not exceed 5.1 dBi in cellular band and 4.15 dBi in PCS band, for purposes of 2.1043 and 2.1091. The antenna(s) used for this transmitter must be installed to provide a separation distance of at least 20 cm from all persons. The antenna(s) used for this transmitter must not be co-located or operating in conjunction with any other antenna or transmitter within a host device.

Radio frequency standards for ZyWAN with PN18 802.11

FCC ID: UFNZEUSPN18

FCC grant information: Modular Approval for mobile RF exposure conditions, the antenna(s) used for this transmitter must be installed to provide a separation distance of at least 20 cm from all persons and must not be co-located or operating in conjunction with any other antenna or transmitter. The only antennas approved for use with this module are those documented in the filings under this FCC ID.

Introduction

The ZyWAN is a cellular routing modem for GSM/GPRS, EvDO/1xRTT CDMA and iDEN networks. It is ideally suited for wireless applications wireless applications such as Internet access, AVL, telemetry, SCADA, mobile computing and AMR. The ZyWAN operates as a fully configurable embedded Linux router enabling firewall, DHCP, DNS and NAT. ZyWAN provides real-time network access to any Ethernet, 802.11 or serial device for mobile and fixed data applications.

A GPS adapter provides a sophisticated tracking program and raw NMEA data strings for mapping applications. The tracking program reports the device location, speed and heading on regular intervals and caches data when out of network. To easily manage the ZyWAN configuration, a Web page presents a simple tool to quickly change settings locally or over-the-air.

This User Manual provides the basic configuration and hardware information required for getting started with the ZyWAN products. For more detailed information, see www.zywan.com for additional technical and addendum documentation

Features

The features offered by the ZyWAN include:

- Rugged design handles challenging industrial or mobile telemetry environments.
- Takes full advantage of TCP/IP technologies of the cellular networks.
- Can be configured as a firewall with a variety of data encryption and authentication methods.
- Provides secure routing of IP data between the cellular network, Ethernet and 802.11 WLAN.
- Can serve as default gateway from local wired or wireless LAN to the Internet.
- Field equipment may be connected through local RS-232, RS-422/485 or LAN ports.
- GPS receiver allows applications or local devices to pinpoint exact location.

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ZyWAN model numbers

The model numbers for the ZyWAN are determined by the hardware options which are part of the product. The list of features and model number variations are explained below.

ZyWAN	-	CCCC	####	-	*Options*

where,

CCCC identifies the cellular network.
GPRS = GPRS/GSM network (Cingular, T-Mobile, O2, Orange, etc.)
IDEN = IDEN network (Nextel)
EVDO = EVDO/CDMA network (Sprint)

identifies the main model variation.
1000 = Base model with COM3 as RS-232
1001 = Base model with COM3 as RS-485

Options identifies additional optional components.
-WF = WiFi (802.11) wireless network
-GPS = GPS receiver

Accessories

Several accessories for the ZyWAN are listed below.

ZW-AC-PSU	ZyWAN AC Power Supply and Power Cord
ZW-Null-Modem	RS232 Null Modem Cable
ZW-RJ45-Xover	Crossover RJ45 Ethernet cable
ZW-Pwr cable	ZyWAN Power Cable -10ft (Included w/ base unit)
ZW-CD	ZyWAN CD (Manual, App notes)
ZW-Starter Kit	ZyWAN Starter KIT (CD,Null modem, Xover, AC PSU)

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Getting started with your ZyWAN

This section helps a first-time user get started using the ZyWAN. It covers:

- What you will need. See page 10.
- Ports, LEDs and connectors. See page 12.
- Installing a SIM card (GPRS/IDEN). See page 17.
- Understanding Interfaces. See page 18.
- Initial configuration with a single PC. See page 19.
- Initial configuration over a network. See page 23.
- Troubleshooting connection problems. See page 27.

What you will need

Hardware requirements

To get started, the ZyWAN must be connected either to a stand-alone computer or to a network, to allow the initial configuration to be made via the Web page.

In order to perform the initial configuration via a stand-alone computer, you need the following:

- ZyWAN unit.
- Power supply.
- Computer with 10base-T Ethernet network port and Web browser.
- Ethernet crossover cable.

In order to perform the initial configuration via an existing network, you need the following:

- ZyWAN unit.
- Power supply.
- Network equipment and cables to connect ZyWAN.
- Computer with network connection, RS-232 serial port and Web browser.
- Serial crossover cable (or some other ability to identify the DHCP-assigned address of the ZyWAN after it powers on).

Software requirements of configuration computer

The computer used to perform the ZyWAN configuration must have:

- Windows operating system (Windows 2000 or Windows XP).
- Web browser (Internet Explorer ver. 6 or ver. 7; or Mozilla Firefox ver. 2)

Other operating systems or Web browsers may be used, but they may not work as described in this document.

Network requirements

The network used to perform the ZyWAN configuration must have:

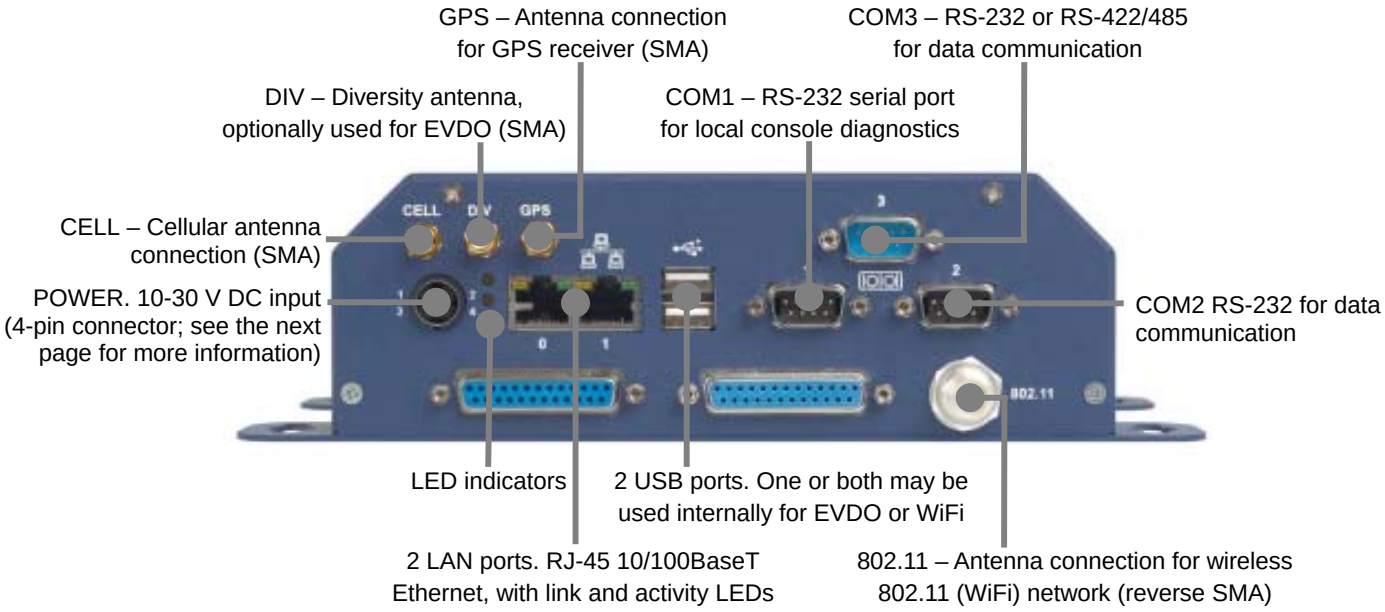
- For initial setup, either a direct connection (via Ethernet crossover) or existing network LAN connection is used from the computer to the ZyWAN.
- After initial configuration, the network configuration may vary depending on whether wired LAN, wireless 802.11 WAN and/or cellular networks are used.
- Knowledge of the final networking address requirements is needed in order to configure the ZyWAN.
- If using cellular services, a registered cellular data account is needed for this ZyWAN.

Optional equipment

Several optional components may be used with the ZyWAN, including GPS Receiver and the Wireless LAN 802.11b card. These modules are plugged into internal sockets of the ZyWAN. Cellular and 802.11 antennas must conform to the requirements on page 6 in order to ensure compliance with FCC regulations.

Ports, LEDs and connectors

The front panel of the ZyWAN contains the following ports and indicators:



Further information about these ports and connectors is provided on the following pages.

LED indicators

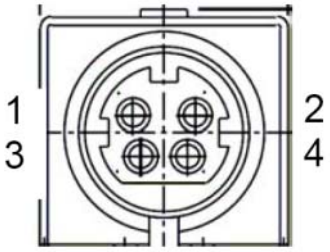
The ZyWAN has three LED lights which indicate the following:

Position	Indicates	Display explanation
Top	Power and GPS	Off = ZyWAN not powered. On = During startup of ZyWAN. Slow blink = ZyWAN running, but no GPS lock. Slow blink is approximately one blink every 2 seconds. Fast blink = ZyWAN running, and GPS position lock obtained.
Middle	Cellular Connection Status	Off = Cellular interface not started (ppp0 not present). On = Cellular interface started, network communication ability probable. (This doesn't necessarily guarantee that communication can occur. For instance, when the interface is established but the device goes out of range of cellular coverage, the light may still indicate a solid On condition.) Slow blink = Received data activity detected on cellular network.
Bottom	WiFi Connection Status	Off = WiFi interface not started (wlan0 not present). On = WiFi interface started, network communication ability probable. (This doesn't necessarily guarantee that communication can occur. For instance, when the interface is established but the device goes out of range of WiFi coverage, the light may still indicate a solid On condition.) Slow blink = Received data activity detected on WiFi network.

Power connection

The ZyWAN can be powered from 10-30 VDC. Power to the ZyWAN is supplied via the 4-pin power socket (mating connector: Kycon KPPX-4P plug). The pin configuration is as follows:

Pin	Signal Name
1	+ Power
2	Ignition sense
3	- Power (GND)
4	GND

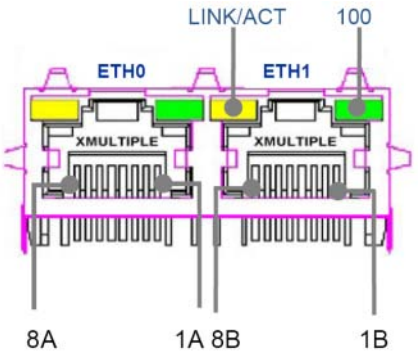


As viewed from the front panel

Ethernet LAN connection

The pin assignments for the Ethernet LAN connection are as follows: The yellow LED is a Link/Activity light, which illuminates when a 10/100Base-T connection is made, and flashes when there is data activity. The green LED illuminates when a 100 MB/s connection is made.

Pin	Signal Name
1	Transmit +
2	Transmit -
3	Receive +
4	Reserved
5	Reserved
6	Receive -
7	Reserved
8	Reserved



Serial connections

Pin assignments for the serial ports are shown in the tables below.

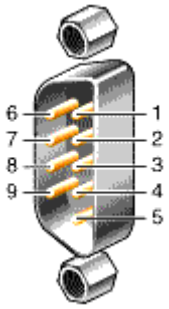
COM1, COM2, COM3 (RS-232) .

Pin	Signal Name
1	Data Carrier Detect (DCD)
2	Receive Data (RX)
3	Transmit Data (TX) *
4	Data Terminal Ready (DTR) *
5	Ground
6	Data Set Ready (DSR)
7	Request To Send (RTS) *
8	Clear To Send (CTS)
9	Ring Indicator (RI)

* = output signals

COM3 (RS-422/485)

Pin	Signal Name
1	n/c
2	n/c
3	RS-422 TX- / RS-485 Data-
4	RS-422 RX-
5	GND
6	n/c
7	RS-422 TX+ / RS485 Data+
8	RS-422 RX+
9	GND



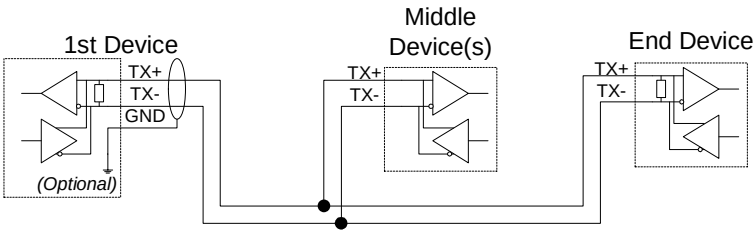
RS-485 / RS-422 wiring diagrams

When connecting RS-485 or RS-422 devices in a multidrop configuration, there must usually be a 120Ω termination resistor at one or both end devices in the network, but NOT on any devices in the middle of the loop.

In RS-485 or RS-422 systems, the ground connection is optional. It is typically used to connect the cable shield for a shielded, twisted pair cable. In the ZyWAN, the RS-485/422 ground is common with the RS-232 grounds, but is isolated from the metal case. In order to avoid ground loops, connect the cable shield to the RS-485/422 GND AT ONLY ONE POINT in the network.

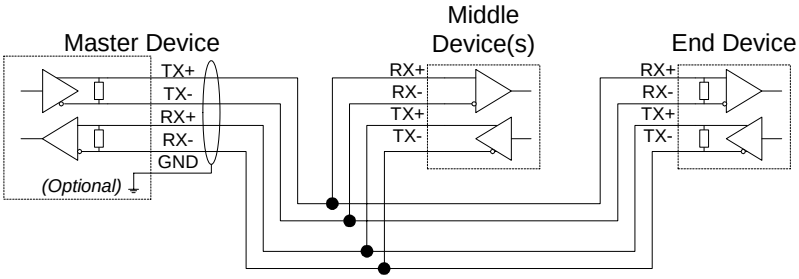
The correct device connection arrangements are shown in the following wiring diagrams:

2-wire RS-485 Device Connections



End devices usually need 120 ohm termination resistor, optional middle device(s) must not have resistor.

4-wire RS-485/422 Device Connections



End device (and RS-485 Master) may need 120 ohm termination resistor, optional middle device(s) must not have resistor. Drawing is labeled as if devices are DTE. Direction of arrows is correct, regardless of RX/TX labeling on a given device.

Drg. S15037-02

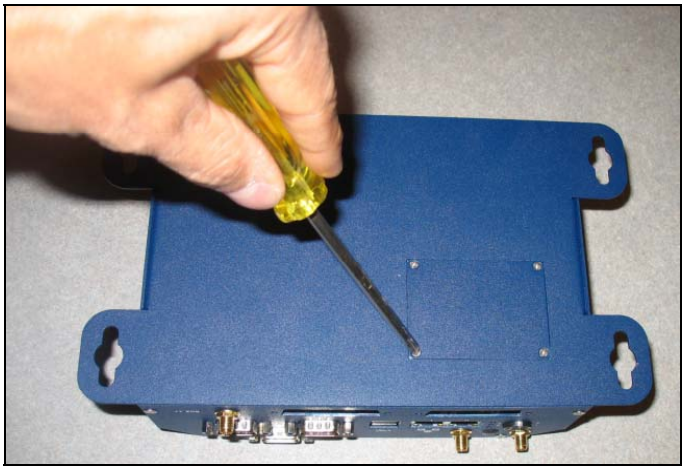
Installing a SIM card (GPRS/IDEN)

The ZyWAN for a GPRS or IDEN network requires a SIM card from the network provider in order to operate on the cellular data network. The SIM card is accessible through an access panel on the bottom of the ZyWAN.

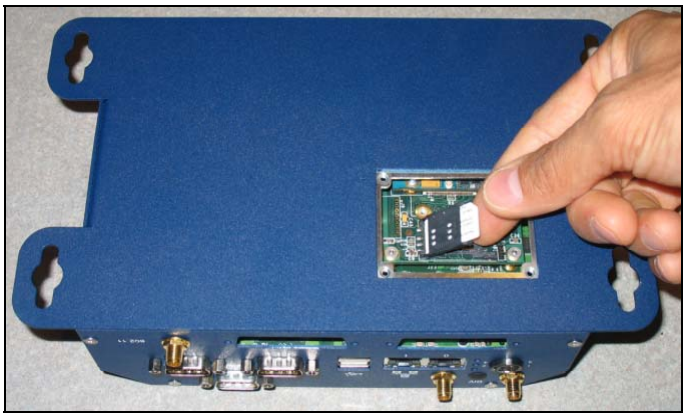
To change or install the SIM card, follow these steps:

1 Remove the power connector, then remove other connectors from the ZyWAN.

2 Unscrew the four screws and remove the access panel on the bottom:



3 Slide the black SIM card holder, and remove the existing SIM card:



4 Install the new SIM card and replace the access panel.

5 Restore all connectors, and finally reconnect the power cable.

Understanding Interfaces

The ZyWAN contains four possible IP network connections or ‘interfaces’. This term and the specific interface names are mentioned throughout this manual and the ZyWAN configuration page. The ZyWAN system assigns each interface a name. The last character of each interface name is a number, 0 (zero) or 1, as listed below. When these interface names are used in the Web configuration page, they must be entered exactly as written (case sensitive).

Name	Interface description
Ethernet port 0	eth0
Ethernet port 1	eth1
Cellular network (for all cellular technologies and providers)	ppp0
802.11 WiFi network	wlan0

Initial configuration with a single PC

The ZyWAN typically comes factory loaded with default settings, which needs to be configured for the network on which it will ultimately be used. The instructions in the following two sections describe how to set up the hardware and software necessary to perform this initial configuration.

Ethernet port ‘0’ is used in this section, which typically comes with standard settings of address 192.168.1.1, subnet mask 255.255.255.0 and operating as a DHCP server. In some cases, the ZyWAN may come factory loaded with different settings. The instructions given here may or may not apply, depending on the customer configuration.

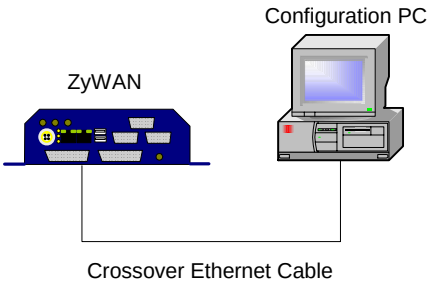
The simplest way to start the ZyWAN and perform an initial configuration is to use a direct connection to another computer (PC). To do this, you should carry out the following:

- Connect the configuration PC using a crossover Ethernet cable.
- Apply power to the ZyWAN.
- Set up the PC’s network settings.
- Configure the ZyWAN via its Web page.

These actions are explained below.

Connect the configuration PC

Connect a crossover Ethernet cable from the network port labelled ‘0’ on the ZyWAN to an Ethernet port on the PC as shown below:



The crossover Ethernet cable may be purchased from Eurotech Ltd, or it may be obtained from a network equipment supplier.

Apply power

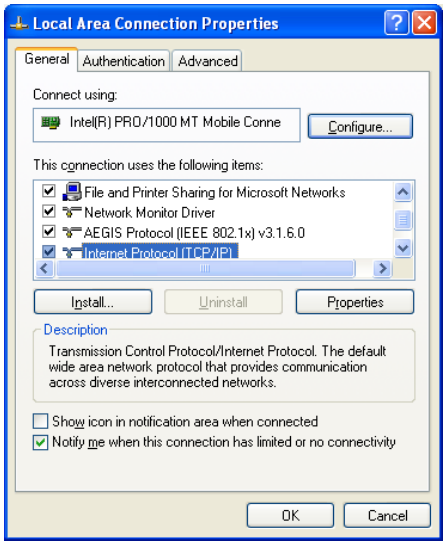
Connect the power supply to a wall outlet and to the 4-position power connector on the ZyWAN. See Power connection on page 14 for the power input socket pin configuration details.

Set up computer's network

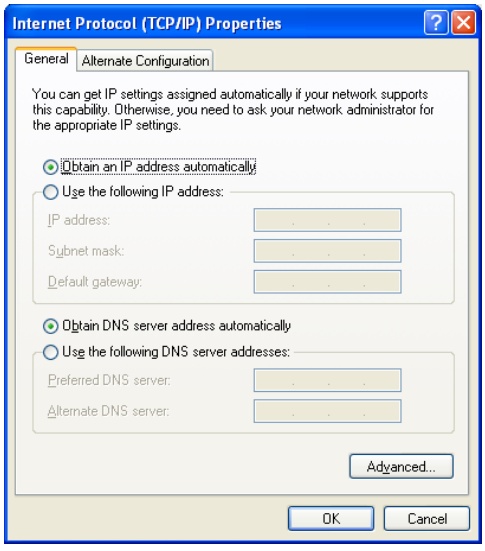
The PC must be set up to obtain its network address from the ZyWAN for this test. After initial configuration of the ZyWAN, the PC can be changed back to its normal network settings.

To configure the network as mentioned above:

1 Select the Windows *Start* menu, *Control Panel*, *Network Connections*. Look at the properties of the *Local Area Connection*:



2 Open the properties for the *Internet Protocol (TCP/IP)*. This should be set to *Obtain an IP address automatically* and *Obtain DNS Server address automatically* as follows:



If the PC address is already set in the range of 192.168.1.*x*, where *x* is any number from 2 to 255, you may not need to change the configuration. Just cancel out of the *Internet Protocol Properties* and skip to the next section, Browse ZyWAN configuration page on page 22.

3 Record the existing settings, then make the changes to obtain the IP address and DNS server automatically.

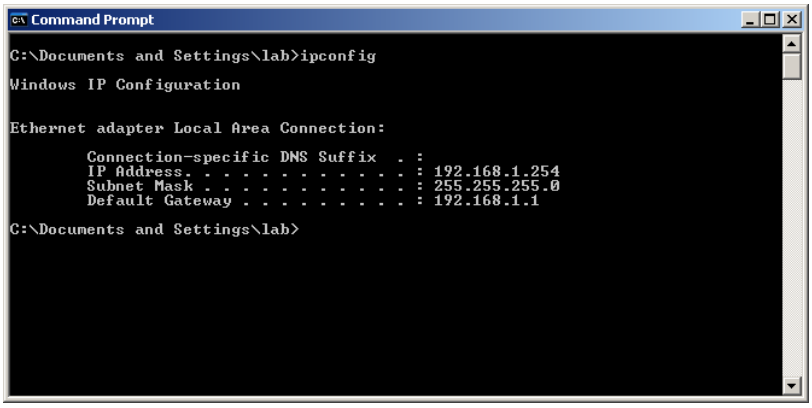
4 Click **OK** to close the *Local Area Connection* properties, and reboot the PC if prompted to do so.

Now the PC should have automatically obtained its address from the ZyWAN.

To check this:

1 Select the Windows *Start* menu, *Accessories*, *Command Prompt*. The *Command Prompt* window is displayed.

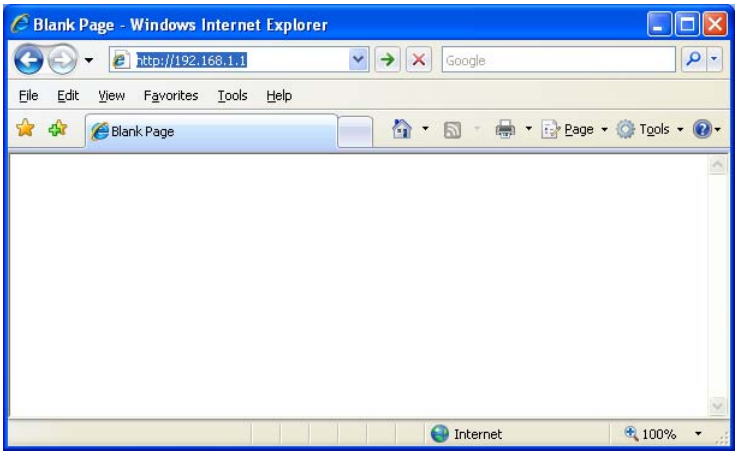
2 Enter the command `ipconfig`. Under *Local Area Connection*, the address should now be 192.168.1.*x*, where *x* is a number between 2 and 254:



Browse ZyWAN configuration page

To browse the ZyWAN configuration page:

1 Open a Web browser and enter the address `http://192.168.1.1` into the address bar:



A dialog box is displayed asking for the username and password.

2 Enter your username and password. The ZyWAN configuration page is displayed. See Configuring the ZyWAN, page 29, for further instructions on configuration.

Initial configuration over a network

An alternate way to start the ZyWAN and perform an initial configuration is to connect it to an existing network which also contains the configuration computer (PC).

To do this, follow the instructions below:

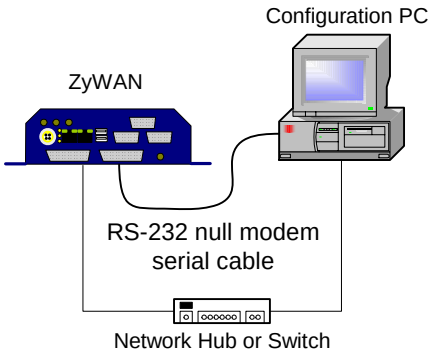
1. Connect ZyWAN to an existing Ethernet network and to the PC serial port. See below.
2. Apply power to the ZyWAN. See page 24.
3. Determine ZyWAN network address. See page 24.
4. Configure the ZyWAN via its Web page. See page 26.

Ethernet port ‘1’ is used in this section, which typically comes configured to obtain its address automatically from a network. In some cases, the ZyWAN may come factory loaded with different settings. These instructions may or may not apply, depending on the customer configuration.

Connect ZyWAN to the network

To connect ZyWAN to the network:

1. Connect the null modem serial cable from the PC to COM1 of the ZyWAN.
2. Connect the ZyWAN network port labelled ‘1’ to an existing network, using a standard 10base-T Ethernet cable as shown below:



The PC should exist on the same network. Consult a network administrator for assistance, if necessary.

Apply power

Connect the power supply to a wall outlet and to the 4-position power connector on the ZyWAN. See Power connection on page 14 for the power input socket pin configuration details.

Determine ZyWAN network address (DHCP)

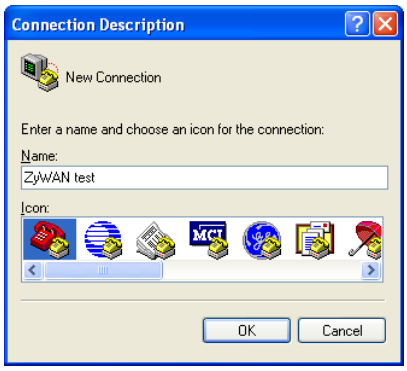
Port 1 on the ZyWAN is typically set to acquire its address automatically using DHCP. Since the address is dynamically assigned, the ZyWAN address must be determined before it can be configured.

One way to check the ZyWAN network address is to use a crossover (null modem) serial cable between the PC and the ZyWAN. The null modem cable can be purchased from Eurotech Ltd, or it may be obtained from an electronics supply store.

If your network administrator can determine the DHCP assigned address after the ZyWAN starts up, the serial cable is not needed. Just skip to the next section, Browse ZyWAN configuration page on page 26.

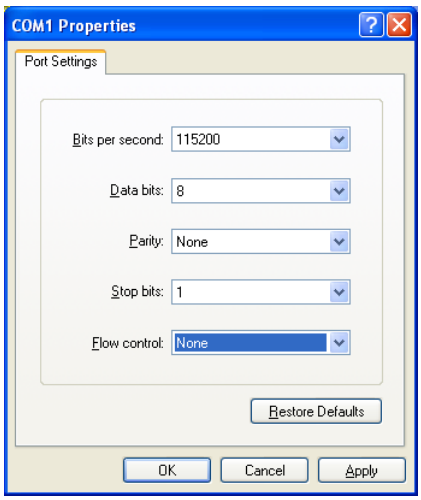
To determine the ZyWAN network address (DHCP):

1. Select the Windows *Start* menu, *Programs*, *Accessories*, *Communications*, *HyperTerminal*. The *Connection Description* window is displayed.
2. Enter a name for this HyperTerminal configuration, as shown below:



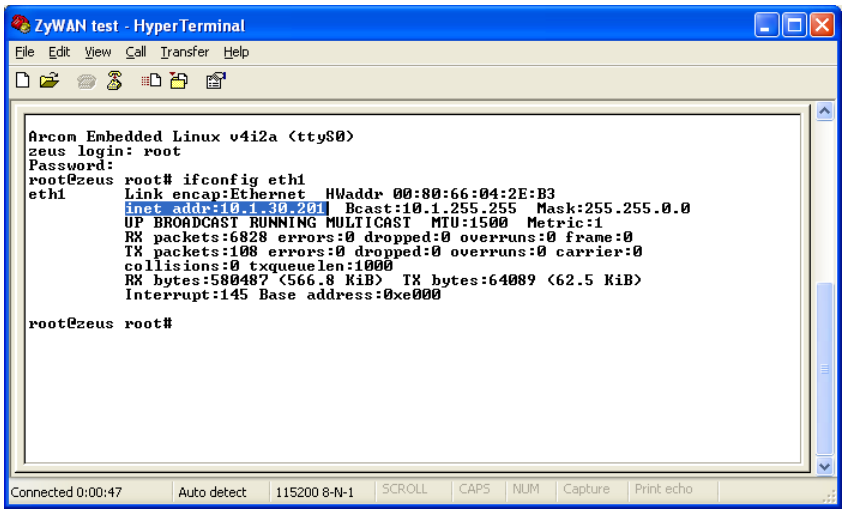
3. Set the *Connect using* option to *COM1*, or whatever free RS-232 port exists on this PC:

4 Make the following settings for the serial communication, then click the **OK** button:



5 If the ZyWAN is already started, press the **Enter** key to get a login prompt. The default login is `root` and the default password is `arcom` (case-sensitive).

6 After logging into the ZyWAN, type the command `ifconfig eth1` at the command prompt. This shows the current network address which has been assigned to the ZyWAN by the network:

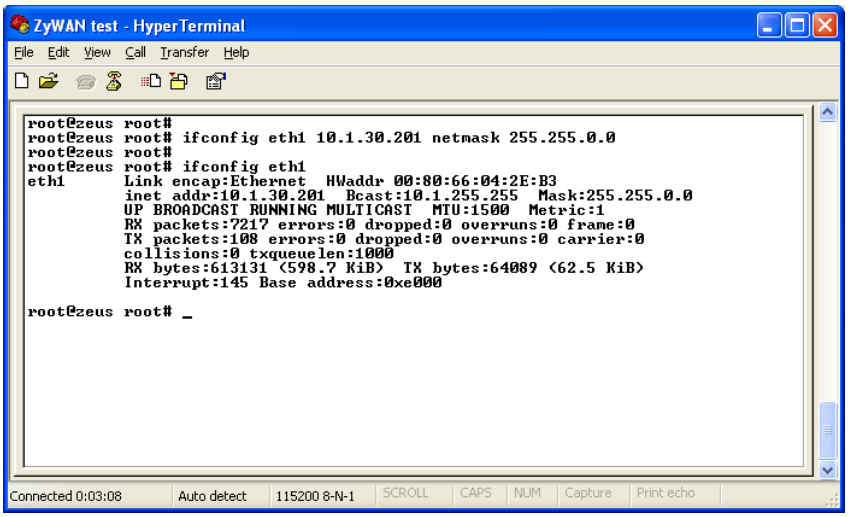


If the `ifconfig` command does not show an `inet addr` address, it may be that the network does not have a DHCP server, or that security policies prohibit the ZyWAN from obtaining its address. An address can be manually set if necessary, by issuing the following command:

`ifconfig eth1` *`ip_address`* `netmask` *`subnet`*

where `ip_address` is the actual address on the network,
and `subnet` is the subnet mask in dotted notation (such as 255.255.0.0).

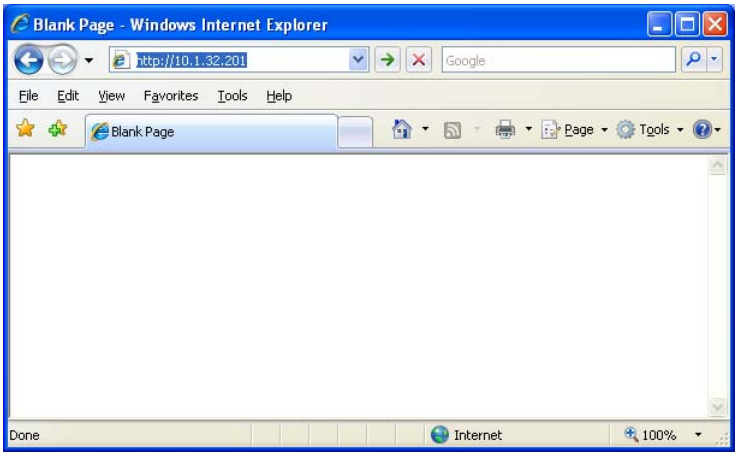
An example is shown below of setting the network address to 10.1.30.201 with a subnet mask of 255.255.0.0:



Browse ZyWAN configuration page

To browse the ZyWAN configuration page:

1 Open a Web browser and enter the address of the ZyWAN into the address bar:



A dialog box is displayed asking for the username and password.

2 Enter your username and password. The ZyWAN configuration page is displayed. See Configuring the ZyWAN, page 29, for further instructions on configuration.

Troubleshooting connection problems

If the Web configuration page does not come up with the instructions given in the last two sections, there are several things which can be done to troubleshoot connection problems.

Ping the ZyWAN

To ping the ZyWAN:

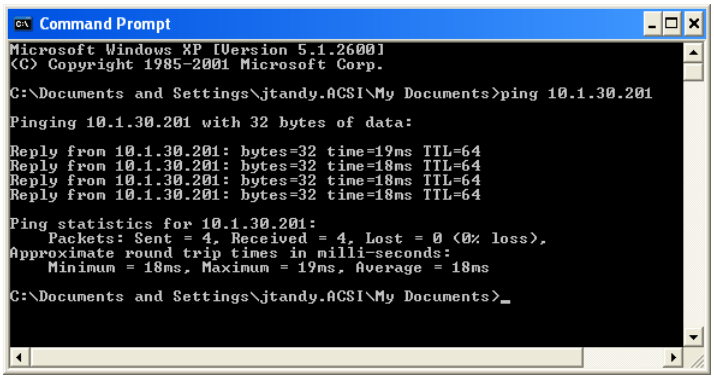
1. Select the Windows *Start* menu, *Accessories*, *Command Prompt*. The *Command Prompt* window is displayed.
2. Type the command:

   `ping address`

   where `address` is the numeric address of the ZyWAN.

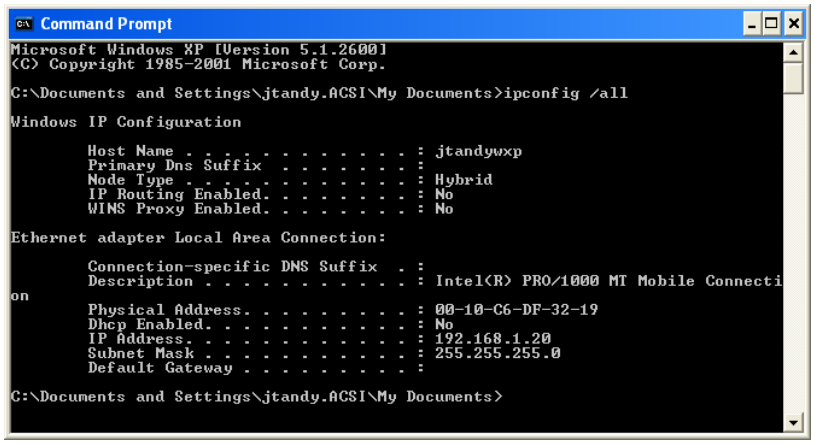
   A diagnostic message is sent to the ZyWAN to check communication.

   If successful, the Ping response should receive a reply as follows:



Check the PC's network configuration

To check the PC's network configuration, type the command `ipconfig /all` in the *Command Prompt* window. The network interface of the PC is displayed:



If using the ZyWAN as a DHCP Server to the PC:

- Make sure the PC *Dhcp Enabled* is set to *Yes*.
- Make sure that the PC has been given a proper address from the ZyWAN, according to how it's configured.

If using the PC in a fixed address mode, check the address and make sure that it is compatible with the address and subnet necessary to communicate on the network or direct to the ZyWAN, depending on the test being performed.

If the ZyWAN is acting as a DHCP Server to the PC and is configured to serve the DNS addresses, these should be displayed in the ipconfig settings.

Log into ZyWAN COM1 for diagnostics

When using a null modem serial cable connected to COM1, as described in Initial configuration over a network on page 23, several commands can be issued to the ZyWAN to diagnose network configuration or operation.

To check network configuration or availability:

```
ifconfig
```

To set a temporary network address on an interface:

```
ifconfig eth1 ip_address netmask subnet
```

where `ip_address` is the actual address on the network,
and `subnet` is the subnet mask in dotted notation (such as 255.255.0.0).

To send a diagnostic message to another device on a network:

```
ping address
```

where `address` is the numeric or named address of another device.
Press **Ctrl-C** to stop the ping.

To check the route table of the ZyWAN:

```
route -n
```

To make a TCP/IP connection to a port on a device:

```
nc ip_address ip_port
```

where `ip_address` is the device address on the network or 127.0.0.1
for the ZyWAN itself,
and `ip_port` is the network port.

Check with network administrator

If you are still unable to get the ZyWAN to connect to an existing network, check with a network administrator for additional support.

Configuring the ZyWAN

Configuration of the ZyWAN is done using a Web browser, either Internet Explorer, Mozilla Firefox or Opera. Other Web browsers have not been tested and may not be fully compatible with the ZyWAN configuration Web page.

Log into Web page

Make sure the ZyWAN is connected to the network.

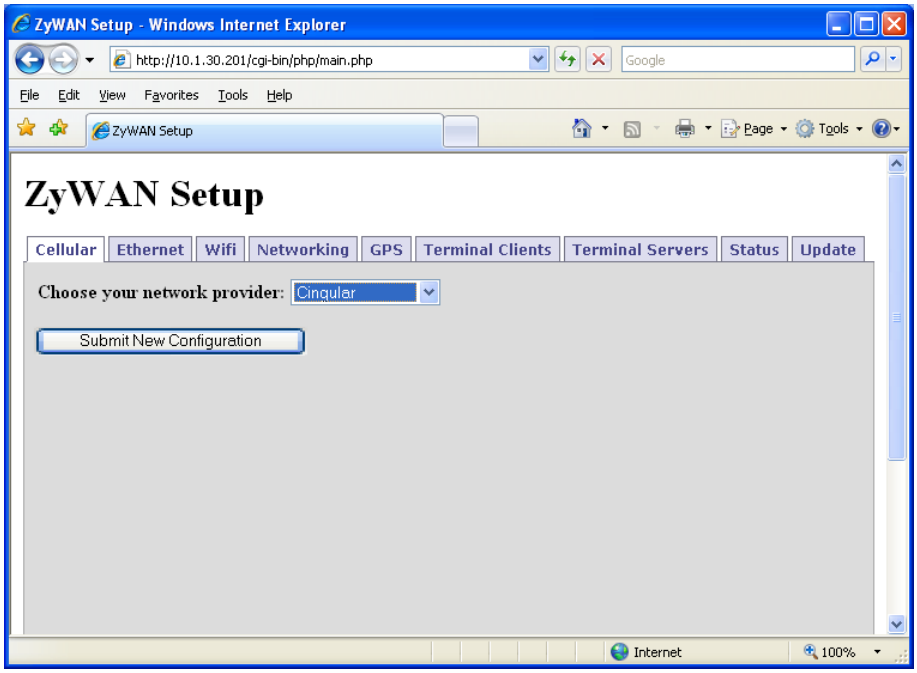
To log into a web page:

1 Enter the appropriate address preceded by ‘http://’. If the ZyWAN has never been configured, see Initial configuration with a single PC on page 19 or Initial configuration over a network on page 23. For instance, typically the default Web address on Ethernet port 0 is http://192.168.1.1.

   If the ZyWAN has been previously configured for a different network configuration, its numeric address should be used instead. The Web configuration page may be accessed via any available network (cellular, WiFi, Ethernet), unless Web access for that network interface has been disabled.

2 Enter your log in details when prompted. The default username is `Arcom` and default password is `Arcom`:

After logging in, the configuration page is displayed, as follows:



The tabs across the top (*Cellular, Ethernet,* etc.) identify each section or page of the configuration. The current settings for any page are read from the ZyWAN whenever a tab is clicked. Clicking on the tab of a page that is currently displayed reloads the existing configuration.

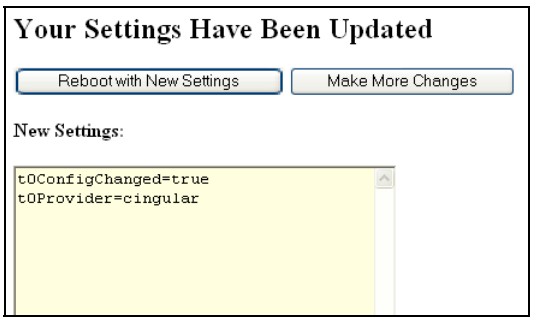
Some Web browsers, such as Internet Explorer, store cached copies of downloaded Web pages. If the ZyWAN software is updated, these changes may not be displayed until the old pages are removed. To correct this, delete *Temporary Internet Files*, close all instances of the Web browser, and then re-open the ZyWAN Web page.

Changing a configuration

The configuration details for each Web page are described in the following sections.

To make changes on any page of the configuration:

1. Enter the changes you want to make and click the **Submit New Configuration** button.
2. Click on any tab or close the browser. The names and values of the properties are displayed in a box with the heading *New Settings*:



   By submitting the configuration, the values of all properties on the displayed page only, are stored in a properties file in permanent memory of the ZyWAN.

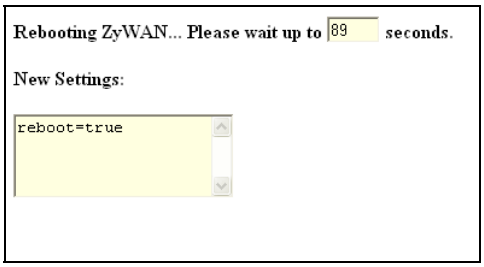
3. If there are more changes to be made on a different page of the configuration, click the **Make More Changes** button. The *Cellular* tab is displayed again, so that another page may be selected and modified.

If changes are not submitted before closing the browser or clicking on another tab, the changes made on that page are lost. Make sure to save changes on each page by clicking the **Submit New Configuration** button.

If the ZyWAN is not rebooted after all changes have been made, it continues to operate with its current settings until the next reboot.

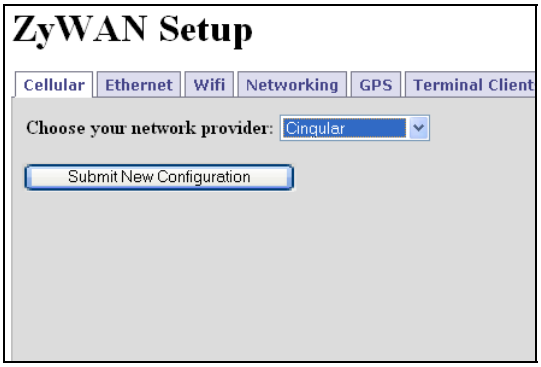
---

4. After all changes have been made, click the **Reboot with New Settings** button. The ZyWAN then reboots so that the changes can take effect. The ZyWAN shuts down and restarts, which may take over a minute. The Web page automatically attempts to reload at the same IP address after 90 seconds:



Even if no new changes have been made, the ZyWAN may be rebooted via the Web page by clicking the **Submit New Configuration** button on any page, then clicking the **Reboot with New Settings** button.

Cellular configuration



The *Cellular* properties, and therefore the ZyWAN base model, are determined by what model of cellular modem is installed. This is configured at the factory. See Status on page 71 to find out the ZyWAN model. The options for ZyWAN model and cellular modem are listed below:

ZyWAN base model	Cellular modem
ZyWAN-GPRS	Wavecom GR64
ZyWAN-IDEN	Motorola iO270
ZyWAN-EvDO	Sierra Wireless MC5725

On the *Cellular* tab, the items must be configured in order to enable the cellular data connection. After setting all the *Cellular* properties, click the **Submit New Configuration** button before switching to a new tab or closing the window. The available options are different depending on the ZyWAN model.

ZyWAN-GPRS options

The ZyWAN-GPRS offers an option to *Choose your network provider*.

Choosing an option determines the network settings which are used to connect to the cellular data network. Options are: *Cingular*, *O2*, *Orange*, *T-Mobile* and *Custom*.

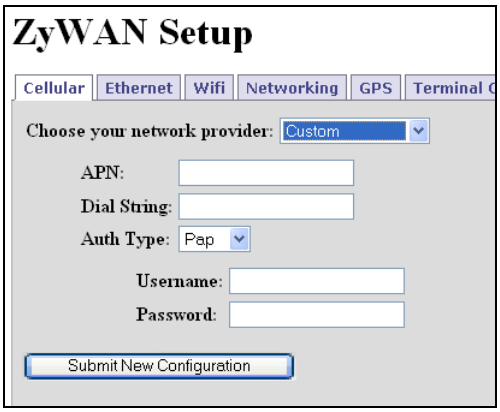
If *Custom* is chosen as the network provider for ZyWAN-GPRS, the following fields and options become available:

Field/Option	Explanation
APN	Enter the APN (Access Point Name) of the cellular provider's data connection. This is supplied by the cellular provider.
Dial String	Enter the AT command dial string which is dialled for connection to the cellular provider's APN.
Auth Type	Enter the Authentication type used by the cellular provider. Available types are: *None*, *Pap* and *Chap*.

If the *Auth Type* is set to *Pap* or *Chap*, the fields are:

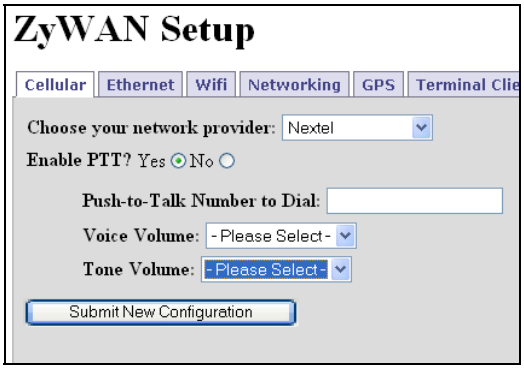
Field	Explanation
Username	Enter the username required to log into the APN of the cellular provider.
Password	Enter the password required to log into the APN of the cellular provider.

The resulting *Cellular* tab looks like this:



ZyWAN-IDEN options

On the ZyWAN-IDEN, the *Cellular* tab looks like this:

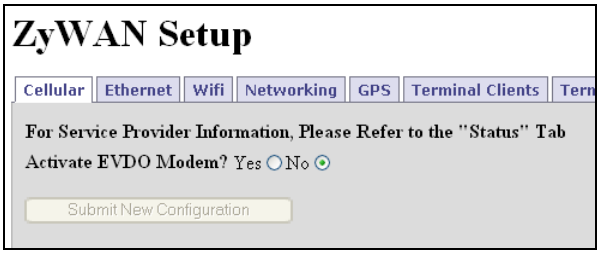


The following items are available:

Field/Option	Explanation
Choose Your Network Provider	Choosing an option determines the network settings which are used to connect to the cellular data network. Options are: *Nextel* and *Southern Linc*.
Enable PTT?	Select *Yes* to enable Push-to-Talk (Direct Connect).
	This option should be set to *No*, because the Direct Connect option is not currently available in the ZyWAN. The following options are inactive, regardless of how *Enable PTT?* is configured.
Push-to-Talk Number to Dial	Outbound PTT number to call when making a Direct Connect call. Enter the number to call, which is typically a series of numbers and asterisks.
Voice Volume	Select the voice volume setting (1-5) with 5 being the loudest.
Tone Volume	Select the tone volume setting (1-5) with 5 being the loudest.

ZyWAN-EVDO options

On the ZyWAN-EVDO, the *Cellular* tab looks like this:



EvDO modem modules contain the account activation information stored in the modem rather than a removable SIM card. Generally this is the responsibility of the customer to activate a module to put it into service. This can also be used to switch to an alternate account on the same module. These operations can be done via the Web configuration page.

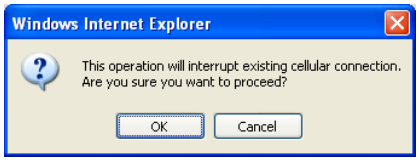
The manual activation process for EvDO consists of the following steps:

1. Obtain the activation code (Master Subsidy Lock) and other NAM profile account information for a data account on an EvDO network.
2. Configure the modem module with the NAM profile information. On the ZyWAN, this is done by filling in the correct fields and clicking the **Set NAM Profile** button.
3. Provision the account profile to be active on the network. On the ZyWAN, this is done by filling in the correct fields and clicking the **IOTA Provision** button. IOTA stands for the 'Internet Over-the-Air' protocol. This must be done in an EvDO coverage area in the service provider's network area.

The EVDO network provider must be specified at the time of order so that the correct modem can be installed from the factory, so this is not given as a user configuration option. The service provider can be viewed on the *Status* page, see Status on page 71 for more information. Typically, the provider is Sprint or Verizon.

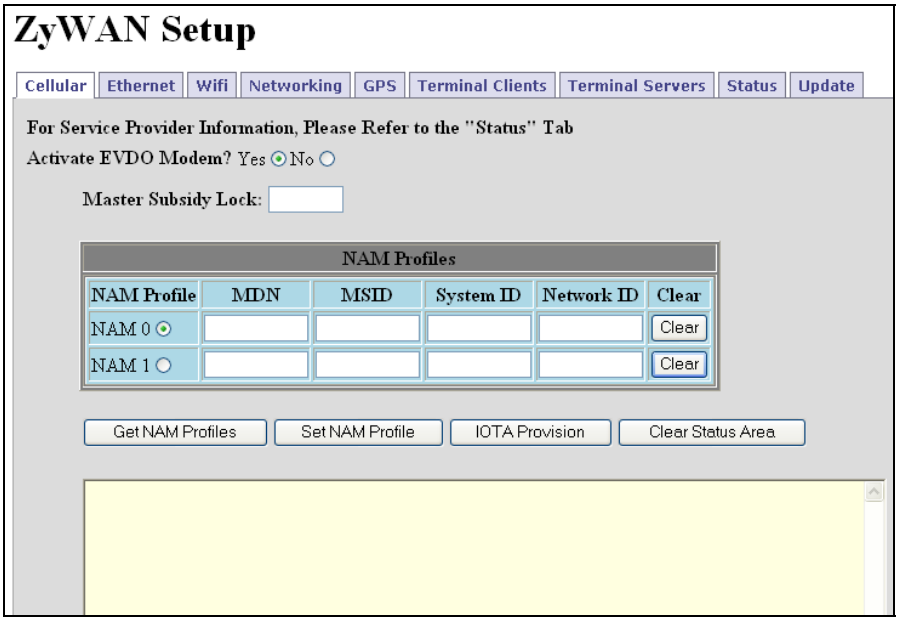
Activate EVDO Modem?

Activation of an EvDO module requires information to be input by the user. Selecting *Yes* displays the following prompt:



The activation process or changing of accounts on the module interrupts any existing cellular connection, if currently active.

If *Yes* is chosen for *Activate EVDO Modem?*, the Cellular tab looks like this:



The screen offers the following fields and options:

Field/Option	Explanation
NAM 0, NAM 1	Select the profile by clicking the toggle button next to either *NAM 0* or *NAM 1*. The *NAM 0* and *NAM 1* profile information allow two different accounts to exist on the same modem module. Some modems may only contain one set of profile information. If both profiles are activated, either may be provisioned for use in the cellular operation. Only one profile may be provisioned at any given time. The four fields for either profile may be cleared by clicking the **Clear** button to the right of the row.
MDN	Enter the Mobile Directory Number (phone access number) of the cellular module.
MSID	Enter the Mobile Station Identifier of the cellular module.
System ID	Enter the *System ID*. Some carriers do not require specific information for this field. For Sprint, set this value to 0.
Network ID	Enter the *Network ID*. Some carriers do not require specific information for this field. For Sprint, set this value to 65535.
Master Subsidy Lock	The *Master Subsidy Lock* is a password for the activation of NAM profiles and is supplied by the network provider. This needs to be entered before a NAM profile may be activated.

The following buttons are available:

Button	Explanation

Get NAM Profiles	Clicking this button reads from the module any existing account profiles in the modem. This reads the *MDN*, *MSID*, *System ID* and *Network ID*, and fill the *NAM 0* and *NAM 1* entries on the Web page with this data. Otherwise, these values (supplied by the network provider) may also be entered by hand into those fields.
	The normal response from this action should begin with *HTTP Reply Status - 200* and contain additional lines with the MDN and other profile information as follows:
	`HTTP Reply Status – 200`
	`<NAM-0>`
	`MDN: 9135299437`
	`MDN: 9852534784`
	`SID: 0`
	`NID: 65535`
	`OK`
	`</NAM-0>`
	`<NAM-1>`
	`MDN: 8585551515`
	`MDN: 0000006951`
	`SID: 0`
	`NID: 65535`
	`OK`
	`</NAM-1>`
	If the word *ERROR* is displayed here, another attempt may be made to request the NAM profiles.

Set NAM Profile	This button activates a profile. After the *Master Subsidy Lock* and all the data for the modem profile are entered, click the **Set NAM Profile** button to activate the profile. After a few seconds, status information is displayed below in the large text area.
	The normal response from this action should begin with *HTTP Reply Status - 200* and end with *NAM Profile is set. Please allow a few seconds for the modem to reset* as follows:
	`HTTP Reply Status – 200`
	`at~namlck=468691`
	`OK`
	`at~namval=0,9135299437,9852534784,0,65535`
	`OK`
	`at!reset`
	`OK`
	`NAM Profile is set. Please allow a few seconds for the modem to reset.`
	Wait at least 5-10 seconds before moving on to the next step. If the word *ERROR* is displayed here, another attempt may be made to set the NAM profile.

Button	Explanation
Set IOTA Provision	After one or both NAM profiles have been activated, select the button for *NAM 0* or *NAM 1*, then click the **Set IOTA Provision** button. This provisions the profile by connecting to the cellular network using this account.

The provisioning process requires an active cellular connection to the service provider, and may not be done in a roaming area. Make sure a cellular antenna is connected to the ZyWAN and that the ZyWAN is located in an area where EvDO/CDMA service for the service provider is available.

Status information is displayed below in the large area. This may take several minutes for a response, possibly up to six minutes. The following message is displayed:

```
Waiting for reply (this may take a few minutes to
complete) …
```

The normal response from this action should look something like the following, and end with the sentence, *IOTA session completed successfully!* Scroll to the bottom of the received text response to validate that this message is given. The message looks like this:

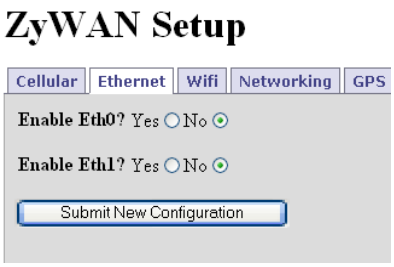
```
       <mmc mmcID=”126”
              status-uri=””>
              <method
                     id=”1”
                     name=”disconnect”
                     reportstatus=”false”
       </mmc>
140> MMC session disconnected, session id=”126”
140> Resetting IOTA session, end status=0
140> HTTP: Shutdown
140> SSL session fff7f4 closed with status 0
140> SSL session fff7f4 deleted
141> Socket 275 closed
142> PPP closed
142> Netlib closed (app_id=101)
142> MIP Profile 1 was provisioned – Set active MIP
profile to 1
142> IOTA session completed successfully! Client
initiated=1

OK
```

If this success message is not displayed here, another attempt may be made to provision the account. If necessary, the entire response text from the text area can be copied and pasted, in order to request troubleshooting assistance from the service provider.

Clear Status Area	Clicking the **Clear Status Area** button clears any previous status information in the text area.

Ethernet configuration

The *Ethernet* tab looks like this:



The following items must be configured in order to enable one or both of the Ethernet network connections:

Enable Eth0?, Enable Eth1?

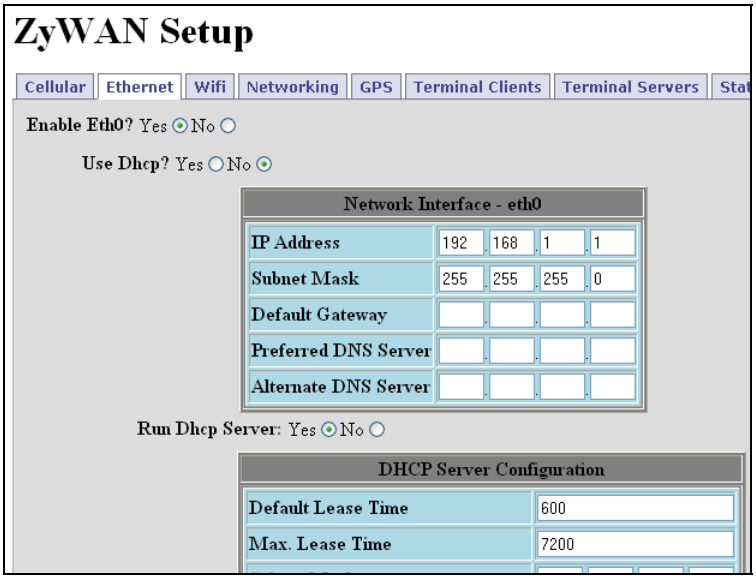
These two settings enable the first and second Ethernet ports available on the ZyWAN. When the Ethernet port is enabled, the following options may be configured.

After setting all the Ethernet properties, click the **Submit New Configuration** button before switching to a new tab or closing the window.

Use DHCP?

If *Use DHCP?* is set to *Yes*, the ZyWAN automatically obtains its Ethernet network address settings from a DHCP server on the LAN. Otherwise, set this parameter to *No* in order to configure specific TCP/IP addresses (see below).

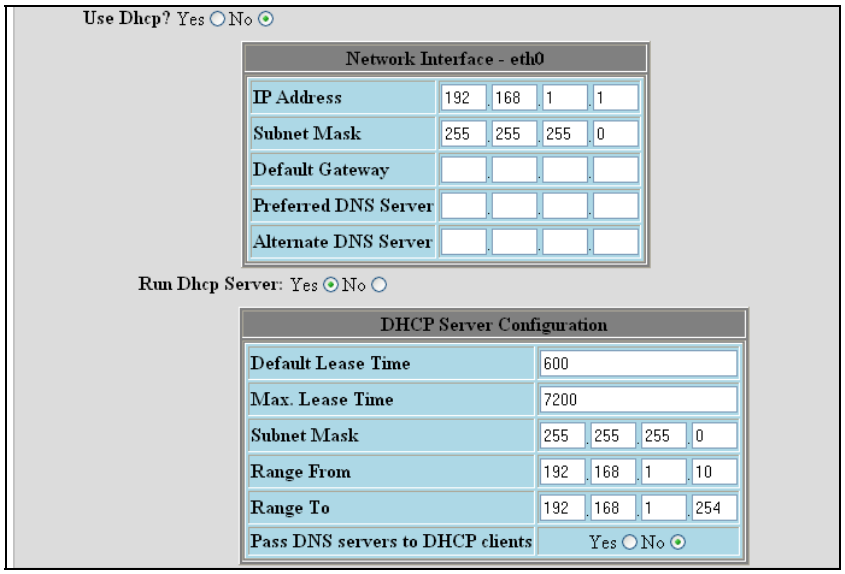
If Use DHCP? is set to No, the *Ethernet* tab looks like this:



The screen offers the following fields:

Field	Explanation
IP Address	Enter the specific numeric address for ZyWAN. Each of the four fields must be a number between 1 and 255.
Subnet Mask	Enter the subnet mask for this Ethernet network. Each of the four fields must be a number between 0 and 255.
Default Gateway	Enter the numeric address of the default gateway for this network. Each of the four fields must be a number between 1 and 255.
Preferred DNS Server	Enter the primary DNS server address. Each of the four fields must be a number between 1 and 255. If DNS is not needed or the server is unavailable, the DNS address may be set to 0.0.0.0.
Alternate DNS Server	Enter the secondary DNS server address. Each of the four fields must be a number between 1 and 255. If DNS is not needed or a secondary DNS server is unavailable, the DNS address may be set to 0.0.0.0.
Run DHCP Server	This option is used when the ZyWAN is to act as a DHCP server on the Ethernet network, assigning network addresses to other devices. Set this to *No* if this option is not used.

If *Run DHCP Server* is set to *Yes*, the *Ethernet* tab looks like this:

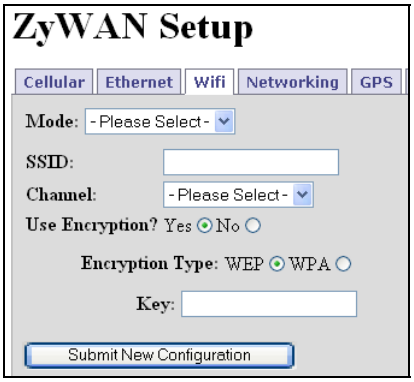


The screen offers the following fields and options:

Field/Option	Explanation
Default Lease Time	Enter the default lease time (in seconds) for the assigned DHCP lease to expire. The default time is the time assigned if the client does not request a specific lease time.
Max. Lease Time	Enter the maximum lease time (in seconds). This is the maximum lease time which is assigned, regardless of whether the client has requested a longer lease time.
Subnet Mask	Enter the subnet mask defining the range of network addresses to be assigned by this DHCP server. Each of the four fields must be a number between 0 and 255.
Range From	Enter the numeric address of the lowest DHCP address to be assigned by this DHCP server. Each of the four fields must be a number between 1 and 254.
Range To	Enter the numeric address of the highest DHCP address to be assigned by this DHCP server. Each of the four fields must be a number between 1 and 254.
Pass DNS Servers to DHCP Clients	Set this option to *Yes* if you want the configured DNS server addresses to be given to other computers receiving their network address from the ZyWAN using DHCP.

WiFi configuration

The *Wifi* tab looks like this:



The following items must be configured in order to enable the 802.11 network connection:

Option/Field	Explanation
Mode	Select the mode of operation of the 802.11 module. Options are: *ad-hoc*, *managed* and *master*. A brief description of these modes is given below: *Ad-hoc*: Network composed of only one group of wireless devices and without an Access Point. *Managed*: ZyWAN connects to an 802.11 Access Point on a network. *Master*: ZyWAN is the synchronization master or acts as an Access Point. Depending on the option selected, several of the main configuration options change, as shown in the table below:
SSID	Enter the network name (domain ID) which is to be used for this wireless network. Enter *any* (case-sensitive) to allow roaming.
Channel	Select the frequency (channel) to use for the wireless network.
Use Encryption?	Select whether to use wireless encryption of data sent through this wireless network. It is strongly recommended to use encryption, unless the application does not support it.

Mode	DHCP/Fixed IP	Run DHCP Server
Ad-hoc	Selectable	Only with fixed IP
Managed	Selectable	Not an option
Master	Fixed IP only	Selectable

Option/Field	Explanation
Encryption Type	If *Use Encryption?* is selected above, select the *Encryption Type*. Options are: *WEP* (Wired Equivalent Privacy) and *WPA* (WiFi Protected Access).
Key *or Passphrase*	*If WEP is chosen for the Encryption Type*, the *Key* must be entered. This is entered as either a 5-character alphanumeric or 10-character hexadecimal string (40-bit encryption), or a 13-character alphanumeric or 26-character hexadecimal value (104-bit encryption). *If WPA is chosen for the Encryption Type*, the *Passphrase* must be entered. This is an 8 to 63 character alphanumeric string or 64-character hexadecimal value (256-bit encryption).

After setting all the *WiFi* properties, click the **Submit New Configuration** button before switching to a new tab or closing the window.

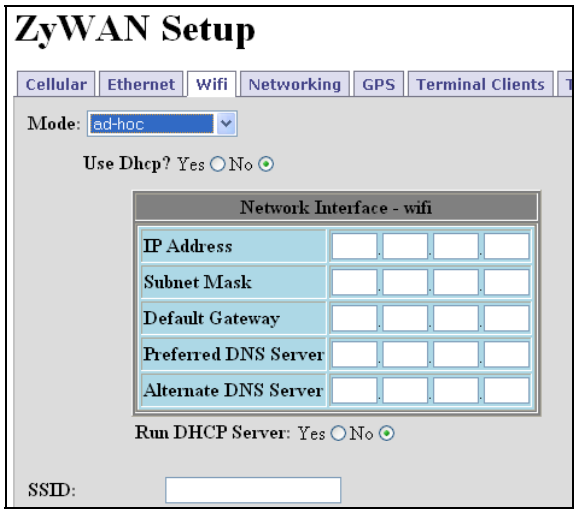
Depending on the choice of *Mode* for *WiFi* operation, the following options are used for the IP address settings:

Use DHCP?

If *Use DHCP?* is set to *Yes*, the ZyWAN automatically obtains its Ethernet network address settings from a DHCP server on the WiFi network.

If this parameter is set to *No* in *ad-hoc* or *managed* modes, or if the mode is set to *master*, the specific TCP/IP addresses must be configured.

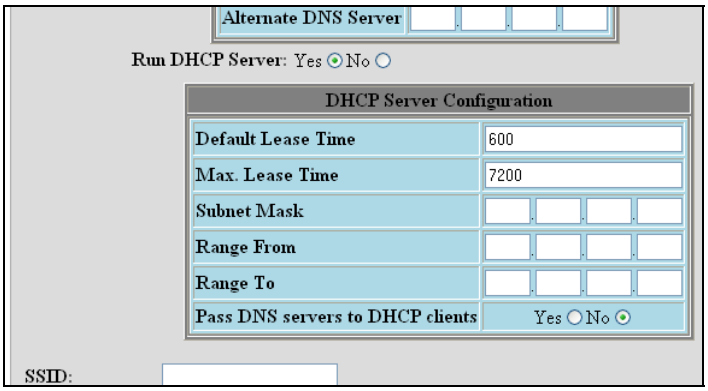
The *Wifi* tab looks like this:



The screen offers the following fields and options:

Field/Option	Explanation
IP Address	Enter the specific numeric address for ZyWAN. Each of the four fields must be a number between 1 and 255.
Subnet Mask	Enter the subnet mask for this Ethernet network. Each of the four fields must be a number between 0 and 255.
Default Gateway	Enter the numeric address of the default gateway for this network. Each of the four fields must be a number between 1 and 255.
Preferred DNS Server	Enter the primary DNS server address. Each of the four fields must be a number between 1 and 255. If DNS is not needed or the server is unavailable, the DNS address may be set to 0.0.0.0.
Alternate DNS Server	Enter the secondary DNS server address. Each of the four fields must be a number between 1 and 255. If DNS is not needed or a secondary DNS server is unavailable, the DNS address may be set to 0.0.0.0.
Run DHCP Server	This option is available when the *Mode* is *ad-hoc* or *master*. This allows the ZyWAN is to act as a DHCP server on the WiFi network, assigning network addresses to other devices. Set this to *No* if this option is not used.

If *Run DHCP Server* is set to *Yes*, the *DHCP Server Configuration* table is displayed:

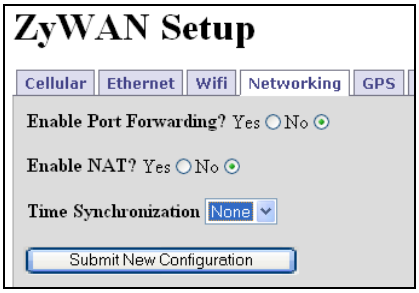


The screen offers the following fields and options:

Field/Option	Explanation
Default Lease Time	Enter the *Default Lease Time* (in seconds) for the assigned DHCP lease to expire. The default time is the time assigned if the client does not request a specific lease time.
Max. Lease Time	Enter the maximum lease time (in seconds). This is the maximum lease time which is assigned, regardless of whether the client has requested a longer lease time.
Subnet Mask	Enter the *Subnet Mask* defining the range of network addresses to be assigned by this DHCP server. Each of the four fields must be a number between 0 and 255.
Range From	Enter the numeric address of the lowest DHCP address to be assigned by this DHCP server. Each of the four fields must be a number between 1 and 254.
Range To	Enter the numeric address of the highest DHCP address to be assigned by this DHCP server. Each of the four fields must be a number between 1 and 254.
Pass DNS Servers to DHCP Clients	Set this option to *Yes* if you want the configured DNS server addresses to be given to other computers receiving their network address from the ZyWAN using DHCP.

Networking configuration

The *Networking* tab looks like this:

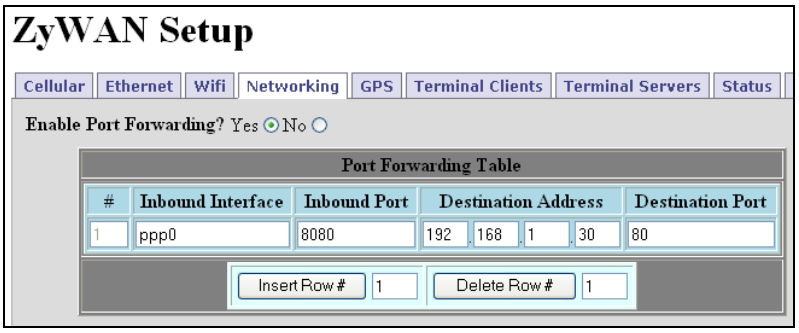


The following items must be configured in order to enable the port forwarding, network address translation or NTP services:

Enable port forwarding?

Select *Yes* if you wish to forward individual IP ports. If a host connection comes in on one network interface at a given port, its communication is redirected to the IP address and port number on one of the ZyWAN interfaces.

If *Enable Port Forwarding* is set to *Yes*, the *Networking* tab looks like this:



Changes made to the *Port Forwarding* and *NAT* portions of the *Terminal Client* page take effect immediately after submitting changes, without requiring a reboot.

The following buttons are available:

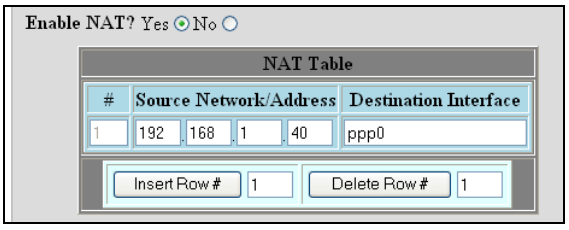
Button	Explanation
Insert Row#	Each of the table rows is numbered. In order to insert a row in the table, enter a number in the box between 1 and one greater than the highest number of rows. Then click the **Insert Row#** button to insert a blank row. This row needs to be filled in with all data required.

Button	Explanation
Delete Row#	In order to delete a row in the table, enter a number in the box between 1 and the highest number of rows. Then click the **Delete Row#** button to delete the row. Once a row is deleted, it cannot be restored without inserting a row and entering the data again.

The screen offers the following fields:

Field	Explanation
Inbound Interface	Enter the name of the network interface on which to monitor the incoming connection to an IP port, such as *eth0* or ppp0. See Understanding Interfaces on page 18 for a description of the available interfaces on the ZyWAN.
Inbound Port	Enter the port number of the incoming connection. Port numbers should be a number between 1 and 65535.
Destination Address	Enter the numeric IP address to which the network traffic is redirected. Each of the four fields must be a number between 1 and 255.
Destination Port	Enter the destination port number to which the network traffic is redirected. Port numbers should be a number between 1 and 65535.
Enable NAT?	Select *Yes* if you wish to enable Network Address Translation, also referred to as IP Masquerading. This allows devices on one interface of the ZyWAN ('internal' side) to access the network on a second interface ('external' side). The ZyWAN translates all IP traffic so that it appears on the external side as a single IP address, but on the internal side there may be multiple addresses which are hidden from the external network (such as multiple devices accessing the Internet through a firewall).

If *Enable NAT* is set to *Yes*, a *Nat Table* is available which looks like this:



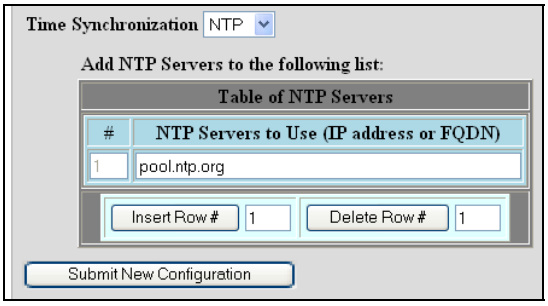
The following buttons are available:

Button	Explanation
Insert Row#	Each of the table rows is numbered. In order to insert a row in the table, enter a number in the box between 1 and one greater than the highest number of rows. Then click the **Insert Row#** button to insert a blank row. This row needs to be filled in with all data required.
Delete Row#	In order to delete a row in the table, enter a number in the box between 1 and the highest number of rows. Then click the **Delete Row#** button to delete the row. Once a row is deleted, it cannot be restored without inserting a row and entering the data again.

The screen offers the following fields:

Field	Explanation
Source Network / Address	Enter the numeric IP address, or range of addresses, which the ZyWAN translates from the source (internal) network. Each of the four fields must be a number between 0 and 255. For instance, entering an IP address network of 172.16.10.0 translates all addresses from 172.16.10.1 through 172.16.10.255.
Destination Interface	Enter the name of the network interface which is the destination (external) side of the network address translation. The public IP address on that interface has already been defined in the *Ethernet* or *WiFi* sections of the configuration, or it might be assigned by the cellular provider as part of the data services activation on that network. The interface names must be entered such as *eth0* or *ppp0*. See Understanding Interfaces on page 18 for a description of the available interfaces on the ZyWAN.
Time Synchronization	Select the method of synchronizing the internal clock of the ZyWAN. Available options are: *None*, *GPS* and *NTP*. The GPS option allows the time to be acquired from the GPS receiver (if installed). The NTP (Network Time Protocol) updates the clock using NTP protocol from a network server.

If *Time Synchronization* is set to *NTP*, a *Table of NTP Servers* is available which looks like this:



The following buttons are available:

Button	Explanation
Insert Row#	Each of the table rows is numbered. In order to insert a row in the table, enter a number in the box between 1 and one greater than the highest number of rows. Then click the **Insert Row#** button to insert a blank row. This row needs to be filled in with all data required.
Delete Row#	In order to delete a row in the table, enter a number in the box between 1 and the highest number of rows. Then click the **Delete Row#** button to delete the row. Once a row is deleted, it cannot be restored without inserting a row and entering the data again. If the clock is not retained after loss of power, it may either be that the battery jumper (LK2 on the main circuit board) is not fitted, or that the coin cell battery has failed and needs to be replaced.

The screen offers the following fields:

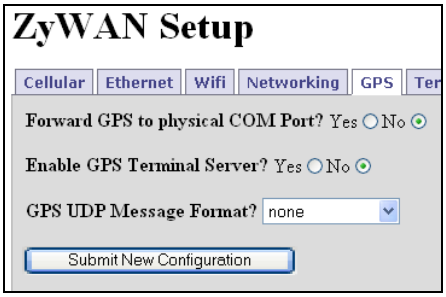
Field	Explanation
Add NTP Servers to the following list:	Enter the network address of one or more NTP servers to use for synchronizing the date and time.
NTP Servers to Use (IP address or FQDN)	Enter either the numeric address or named address (Fully Qualified Domain Name, FQDN) where the NTP server exists. Insert additional rows if more NTP servers are desired.

Field	Explanation
	The best time server to use is one available on a local network, if available. This avoids using public Internet resources and gives more accurate time. The second best option is to use a time server which is located on the Internet somewhere close (small roundtrip time). Otherwise, some possible addresses are: 0.pool.ntp.org, 1.pool.ntp.org and 2.pool.ntp.org (these addresses point to three randomly assigned servers, which change every hour), or simply pool.ntp.org.

After setting all the properties, click the **Submit New Configuration** button before switching to a new tab or closing the window.

GPS configuration

The *GPS* tab looks like this:



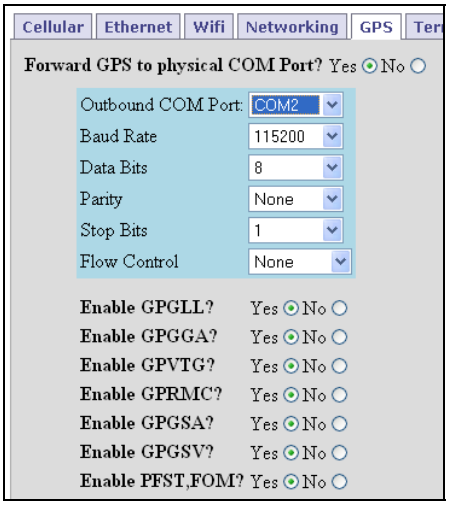
GPS (global positioning system) data is gathered from the GPS receiver using the standard NMEA protocol and may be redirected to either a serial or TCP port. See the NMEA Web site (www.nmea.org) for more information on the NMEA protocol standard. The GPS data may also be cached and delivered to a server in another format using the UDP protocol.

The following options may be configured to enable the collection and distribution of GPS data:

Option	Explanation
Forward GPS to physical COM Port?	Select *Yes* for this item to send GPS data to a physical serial port on the ZyWAN in NMEA format. See page 52.
Enable GPS Terminal Server?	Select *Yes* to enable a terminal server on the ZyWAN, which allows a host to connect and obtain streaming GPS data over a network connection in NMEA format. See page 54.
GPS UDP Message Format?	Select a data format to enable the ZyWAN to send GPS data over a network connection using UDP protocol. Available options are *None*, *Arcom Format* and *ActSoft Format*. When selecting the *ActSoft Format*, the server address is sent to a Comet Tracker server by Actsoft™ Inc. (see www.actsoft.com). When selecting the *Arcom Format*, a server is required which is able to handle the *Arcom* GPS data format. See page 55. See Arcom format for GPS messages (UDP) on page 57 for further details.

After setting all the properties, click the **Submit New Configuration** button before switching to a new tab or closing the window.

If *Forward GPS to Physical COM Port* is set to *Yes*, the *GPS* tab looks like this:



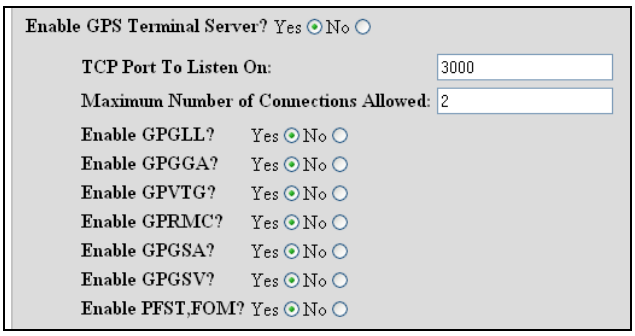
The screen offers the following options:

Option	Explanation
Outbound COM Port	Select the serial COM port to which the GPS data is sent.
	Make sure this COM port is not configured for another service in the ZyWAN. Otherwise, both services may conflict for the port and not operate correctly.
Baud Rate	Select the baud rate to use for the serial GPS output. Baud rate options range from 1200 to 115,200 bps.
Data Bits	Select the number of data bits to use for the serial GPS output. Options are *5*, *6*, *7* and *8*.
Parity	Select the parity to use for the serial GPS output. Options are *None*, *Odd*, *Even*, *Mark*, *Space*.
Stop Bits	Select the number of stop bits to use for the serial GPS output. Options are *1*, *1.5* and *2*.
Flow Ctrl	Select whether to use hardware flow control for the serial GPS output. Options are *None* and *RTS/CTS* (hardware flow control).

The *Enable* options determine which NMEA messages is sent through the COM port:

Option	Explanation
Enable GPGLL?	Select *Yes* to enable the *GPGLL* message in the NMEA data stream.
Enable GPGGA?	Select *Yes* to enable the *GPGGA* message in the NMEA data stream.
Enable GPVTG?	Select *Yes* to enable the *GPVTG* message in the NMEA data stream.
Enable GPRMC?	Select *Yes* to enable the *GPVTG* message in the NMEA data stream.
Enable GPRMC?	Select *Yes* to enable the *GPRMC* message in the NMEA data stream.
Enable GPGSA?	Select *Yes* to enable the *GPGSA* message in the NMEA data stream.
Enable GPGSV?	Select *Yes* to enable the *GPGSV* message in the NMEA data stream.
Enable PFST,FOM?	Select *Yes* to enable the *PFST* and *FOM* messages in the NMEA data stream.

If *Enable GPS Terminal Server?* is set to *Yes*, the window looks like this:



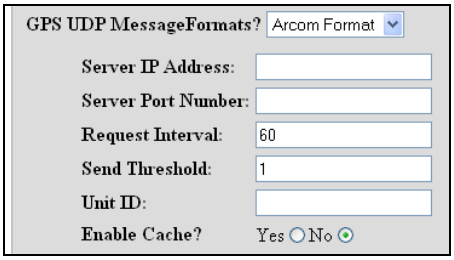
The screen offers the following fields:

Field	Explanation
TCP Port To Listen On:	Enter the port number to use for the terminal server which delivers GPS data to a host. Port numbers should be a number between 1 and 65535.
Maximum Number of Connections Allowed:	Enter the maximum number (between 1 and 8) of simultaneous host connections which are allowed to connect to the ZyWAN to receive streaming GPS data.

The *Enable* options determine which NMEA messages are sent through the network port:

Option	Explanation
Enable GPGLL?	Select *Yes* to enable the *GPGLL* message in the NMEA data stream.
Enable GPGGA?	Select *Yes* to enable the *GPGGA* message in the NMEA data stream.
Enable GPVTG?	Select *Yes* to enable the GPVTG message in the NMEA data stream.
Enable GPRMC?	Select *Yes* to enable the *GPRMC* message in the NMEA data stream.
Enable GPGSA?	Select *Yes* to enable the *GPGSA* message in the NMEA data stream.
Enable GPGSV?	Select *Yes* to enable the *GPGSV* message in the NMEA data stream.
Enable PFST,FOM?	Select *Yes* to enable the *PFST* and *FOM* messages in the NMEA data stream.

If *GPS UDP Message Format?* is set to *Arcom Format* or *ActSoft Format*, the window looks like this:



The screen offers the following fields and options:

Field/Option	Explanation
Server IP Address:	Enter the numeric IP address or FQDN to which the UDP packets are sent containing GPS data. This is the address of the host computer, which should be available on the network (such as the Internet) to receive this data. Each of the four fields must be a number between 1 and 255. If the ActSoft Format is used, this IP address should generally be gps.comettracker.com.
Server Port Number:	Enter the destination port number on the host computer which receive the GPS data over UDP. Port numbers should be a number between 1 and 65535. If the ActSoft Format is used, the port number should generally be 8502.
Request Interval:	Enter the interval (in seconds, between 30 and 65535) for how often the GPS data is obtained from the GPS receiver. Multiple GPS positions can be collected and buffered, to be sent all together as determined by the *Send Threshold* (below), in order to reduce the network traffic.
Send Threshold:	Enter the Send Threshold as a number between 1 and 19. The Send Threshold is a numeric value which indicates how many GPS positions should be sent in one position message. The position message shall not be sent until the specified number of GPS positions have been obtained from the GPS receiver.

Field/Option	Explanation
Unit ID:	Enter the unit ID which identifies the GPS data from this ZyWAN when reported to a host computer. This allows the host computer to have unique identifiers for data coming from multiple remote units. When using the Actsoft format, this *Unit ID* must be a unique 10-character serial number to identify this device in the Actsoft system. For *ZyWAN-GPRS*: The *Unit ID* is a unique 10-character serial number, with format to be specified by ActSoft. For *ZyWAN-IDEN*: The *Unit ID* is the 10-character modem serial number. For *ZyWAN-GPRS*: The *Unit ID* is a unique 10-character serial number, with format to be specified by ActSoft. It is essential to observe that this modem serial number is entered correctly. If not, and if duplicate ID's are reporting from any other device, both customers may suffer loss of data and an interruption of service.
Enable Cache?	Select *Yes* to enable caching of GPS data. When caching is enabled, the ZyWAN stores 100 positions in non-volatile memory. After this cache is filled, the oldest positions are discarded. Once the network connection is re-established, positions in the cache are transmitted in a first-in, first-out order. When *Enable Cache* is set to *Yes*, a UDP acknowledgement is required from the host computer, which allows the ZyWAN to verify the data has been received. If the UDP acknowledgement is not received, the data points begin to be cached. The *Enable Cache* option requires that the ZyWAN network address must be accessible to host computer, since the host must initiate a one-way UDP acknowledgement message to the ZyWAN. If the acknowledgement is not received (due to network problems, etc.), the ZyWAN caches the GPS points based on the *Request Interval* and *Send Threshold* parameters (above), and continues to try sending the next point every 10 seconds. When *Enable Cache* is set to *No*, a UDP acknowledgement is not required. The ZyWAN simply sends out the GPS points and discard them locally. If the host computer does not receive the position message, those positions are lost.

Arcom format for GPS messages (UDP)

When using the *Arcom Format* for GPS data, the position message shall be transmitted using the User Datagram Protocol (UDP). If caching is enabled, the ZyWAN waits a minimum of 10 seconds to receive an acknowledgement message after transmission of a position message. If a response message is received that does not contain the characters *ACK* or no message is received within the timeout period, the position message shall be retransmitted. This process shall continue indefinitely. The *ACK* should be 3 ASCII characters (0x41 0x43 0x4B).

The position message is defined below. The first 12 bytes are a header, followed by 19-byte portions containing the timestamp and position information. The number of these 19-byte portions is determined by the *Send Threshold* parameter. All data shall be in binary big-endian format, unless otherwise specified.

Message header:

som(1)	snum(10)	npos(1)

Position data (repeated):

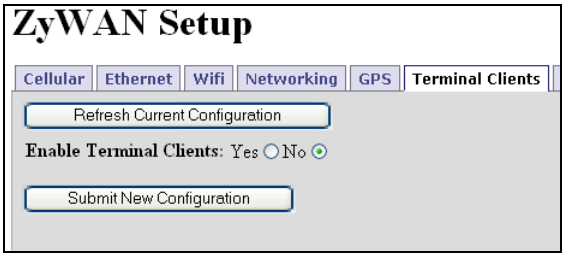
sval(1)	time(4)	stat(1)	sats(1)	lat(4)	lon(4)	psrc(1)	speed(1)	head(2)

Field	Bytes	Description
som	1	Start of message indicator. Always set to 0x7E.
snum	10	Unit serial number in ASCII left justified and null(0) filled to the right.
npos	1	Number of positions in this message.
sval	1	Sequence value for each position transmitted. The sequence value for the first position transmitted is 0. The sequence value is incremented by 1 for each subsequent position transmitted. Since this value is only one byte, the maximum sequence value is 255.
time	4	UTC timestamp of the GPS position. This value is in seconds since 1/1/1970.
stat	1	This field contains a code representing status of the position from the GPS receiver. In addition, bits 5-7 are used as flags for other conditions. *Status Codes:* Bit: 1 Condition: No response from GPS receiver. Bit: 2 Condition: Error in response from GPS receiver. Bit: 3 Condition: Almanac error response from GPS receiver Bit: 4 Condition: Good position response from GSP receiver

Field	Bytes	Description
		Flag Bits: Bit 5: UTC TIME FLAG – This bit must be set to indicate that the TIMETAG represents UTC time. Bit 6: OVERFLOW FLAG – This bit is set to indicate that this position, after being added to the store and forward cache, caused an existing position in the store and forward cache to be deleted. Bit 7: FIRST POSITION FLAG – This bit is set to indicate that this is the first position to be transmitted after the device was powered on. For all subsequent positions, this bit must be cleared.
sats	1	Number of satellites currently being tracked.
lat	4	Latitude of the position in 1/100,000 minutes. For example, the 'North 26 Degrees 8.767840 Minutes' is represented as (26 * 60 * 100000 + 8.767840 * 100000) = 156876784.
lon	4	Longitude of the position in 1/100,000 minutes. For example, the 'WEST 80 Degrees 15.222400 Minutes' is represented as - (80 * 60 * 100000 + 15.222400 * 100000) = - 481522240.
psrc	1	ASCII 'G'(0x47) if this is a valid GPS position, otherwise ASCII 'N'(0x4E).
speed	1	Speed in miles per hour.
head	2	Heading in degrees

Terminal Clients

The *Terminal Clients* tab looks like this:

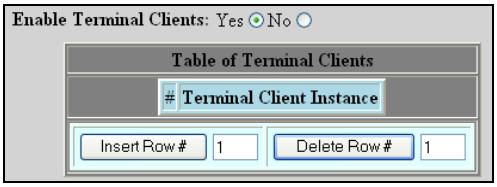


The various items must be configured in order to set up Terminal Client services. The Terminal Client makes an outbound TCP/IP connection to a remote server, allowing pass-through communication with a local serial port. Its serial port also provides AT command emulation, to act similar to a dial modem.

After setting all the ***Terminal Client*** properties, click the **Submit New Configuration** button before switching to a new tab or closing the window.

Changes made to the *Terminal Client* page take effect immediately after submitting changes, without requiring a reboot.

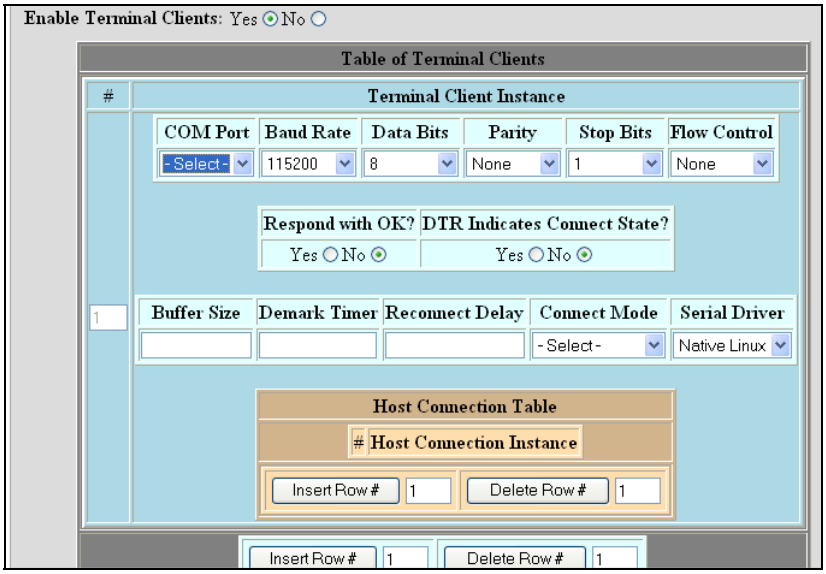
To allow one or more Terminal Client services to be configured, set *Enable Terminal Clients* to *Yes*. The *Table of Terminal Clients* is displayed:



The following buttons are available:

Button	Explanation
Insert Row#	Each of the Terminal Clients exists as a large set of properties in a numbered table row. In order to insert a row in the table, enter a number in the box between 1 and one greater than the highest number of rows. Then click the **Insert Row#** button to insert a blank row. This row must be filled in with all data required. Note that this table can get very large, with inner tables on each Terminal Client table row. When adding or deleting a Terminal Client configuration, make sure to click the **Insert Row#** or **Delete Row#** buttons at the very bottom of the main table.
Delete Row#	In order to delete a Terminal Client configuration (a row in the main table), enter a number in the box between 1 and the highest number of rows. Then click the **Delete Row#** button to delete the row. Once a row is deleted, it cannot be restored without inserting a row and entering the data again.

The *Table of Terminal Clients* is part of the Terminal Client configuration:



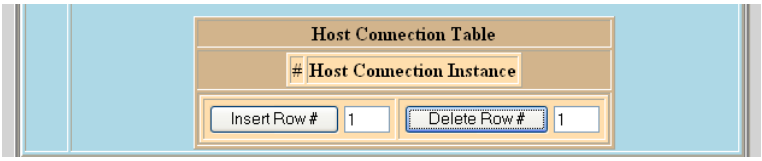
The following fields and options are available and must be set for each configured Terminal Client configuration:

Field/Option	Explanation
COM Port	Select the serial COM port to which the Terminal Client data is sent. Make sure this COM port is not configured for another service in the ZyWAN. Otherwise, both services may conflict for the port and not operate correctly.
Baud Rate	Select the baud rate to use for the Terminal Client port. Baud rate options range from 1200 to 115,200 bps.
Data Bits	Select the number of data bits to use for the Terminal Client port. Options are *5*, *6*, *7* and *8*.
Parity	Select the parity to use for the Terminal Client port. Options are *None*, *Odd*, *Even*, *Mark*, *Space*.
Stop Bits	Select the number of stop bits to use for the Terminal Client port. Options are *1*, *1.5* and *2*.
Flow Ctrl	Select whether to use hardware flow control for the Terminal Client port. Options are *None* and *RTS/CTS* (hardware flow control).
Respond with OK?	Choose whether an *OK* message is sent in response to AT commands entered at the Terminal Client serial port. The *OK* response is similar to the way in which a modem responds over its serial port.

Field/Option	Explanation
DTR Indicates Connect State	Specify whether DTR indicates the IP connection state. If set to *Yes*, the serial port's DTR output is asserted to a positive voltage when the IP connection is established, and is de-asserted when the IP connection is lost. This is meant to operate similar to a Carrier Detect (CD) output from a dial modem, which is asserted after a data connection is established.
Buffer Size	Enter the maximum number of data bytes (between 1 and 4095) which are allowed in an IP packet. The actual amount may be less if the *Demark Timer* (below) times out before the serial buffer is full.
Demark Timer	Enter the maximum time (in milliseconds, between 10 and 30000) the ZyWAN waits for non-activity on the serial port before sending whatever serial data has been received.
Reconnect Delay	Enter the length of time (in seconds, between 1 and 65535) the Terminal Client waits before attempting to re-establish a lost connection with the server, if the connection has been dropped for any reason. This option only applies when the *Connect Mode* is set to *Continuously*.
Connect Mode	Choose the connection mode. The options available are: *Continuously*: Connect automatically upon system restart, or upon either device dropping the IP connection. There must be only one Host Connection row, with its *Matching Dial String* set to an empty field. *Any Data*: Connect only when data is received from a serial device connected to the COM Port. There must be only one Host Connection row, with its *Matching Dial String* set to an empty field. *ATDT String*: Connect only if an *ATDT###* message is received on the serial port, where ### is some alphanumeric string. There may be many Host Connection rows configured under this Terminal Client, with their *Dial String* set to unique *ATDT###* values. This acts as a modem emulator, whereby each ATDT dial sequence initiates a connection to an IP address. Until a matching dial string is received, the ZyWAN does not make an outbound Terminal Client connection. See *Matching Dial String* (below) for more details. *Use DCD Pin*: Connect if the Data Carrier Detect (DCD) input signal on the serial port is raised to a positive RS-232 voltage. This must be used with an RS-232 port, and does not apply when COM3 in its RS-485 hardware option. There must be only one Host Connection row, having its *Matching Dial String* set to an empty field.

Field/Option	Explanation
	ATDT or DCD: Connect if either *ATDT###* message is received or if the Data Carrier Detect (DCD) signal on the serial port is asserted. If the ATDT message is received, it is compared against the *Matching Dial String* in the Host Connection rows to find which IP address to use for connection. If the DCD is received, the ZyWAN is connected to the IP address of the first Host Connection row with an empty field for the *Matching Dial String*.
Serial Driver	Select whether to use the Native Linux (ttyS) serial driver, or the Eurotech Ltd driver which allows for half-duplex RS-485 communication. Presently the Eurotech Ltd driver is not available.

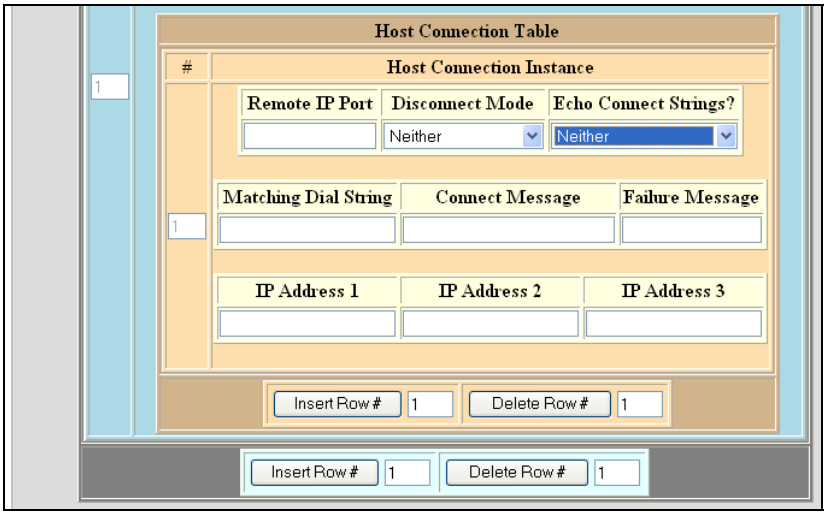
The *Host Connection Table* is part of the Terminal Client configuration:



At least one row must be configured in the *Host Connection Table* for it to work properly:

Button	Explanation
Insert Row#	Each row of the **Host Connection Table** exists as a set of properties in a numbered table row within the Terminal Client configuration. In order to insert a row in the table, enter a number in the box between 1 and one greater than the highest number of rows. Then click the **Insert Row#** button to insert a blank row. This row must be filled in with all data required. Note that when adding or deleting rows of a Host Connection Table, make sure to click the **Insert Row#** or **Delete Row#** buttons within the brown section of the Terminal Client, not the buttons at the very bottom of the main table.
Delete Row#	In order to delete a row of the **Host Connection Table**, enter a number in the box between 1 and the highest number of rows. Then click the **Delete Row#** button to delete the row. Once a row is deleted, it cannot be restored without inserting a row and entering the data again.

The *Host Connection Table* looks like this:



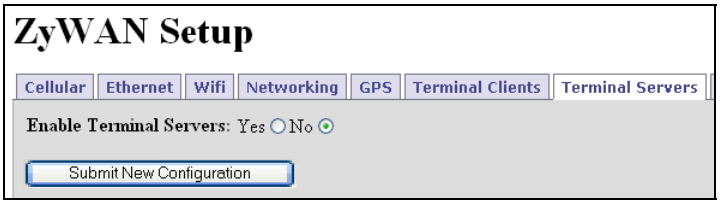
The following fields and options are available for each row of the *Host Connection Table*. Multiple rows may be added if necessary:

Field/Option	Explanation
Remote IP Port	Enter the port number (between 1 and 65535) to which the Terminal Client connects. The same port number is used to attempt connections to each of the three IP Addresses, if configured. There is no option to connect to different port numbers for each address in the Host Connection row.
Disconnect Mode	Select when to disconnect from the remote address. In any case of a session disconnect, the *Connect Mode* (above) determines how a reconnection occurs. Options available are: *On* +++: Disconnect if the characters +++ (and no more than three + characters) are received on the serial port within the *Demark Time*. This emulates the modem attention string often used prior to hanging up a dial connection. *On Dropped DCD*: Disconnect when the Data Carrier Detect (DCD) input on the serial port goes to a low (inactive) state. Either: Disconnect either on receiving +++ at the serial port or on an inactive serial DCD line. *Neither*: Never disconnect from the remote server. Connections may still be lost due to the remote side dropping its connection or because of network interruptions.

Field/Option	Explanation
Echo Connect Strings?	Choose whether to echo all commands. The options are: *To Async*: Echo the *Connect Message* and *Failure Message* to the serial port after a connection attempt or after the Terminal Client disconnects. *To Async and Socket:* Echo the *Connect Message* and *Failure Message* to the serial port and to the remote server after a connection attempt or after the Terminal Client disconnects. *Neither*: Do not echo the strings to the serial or TCP port.
Matching Dial String	Enter the ATDT string that is used to make a connection if the *Connect Mode* option is set to *ATDT* or *ATDT or DCD*. Otherwise, leave this field empty. The string should always start with the letters *ATDT* and be followed by some unique text (uppercase/lowercase text is treated the identically, and spaces are ignored). For instance, the Host Connection rows may contain *Matching Dial Strings* of *ATDT1*, *ATDT555-1212*, *ATDTDIAL*. When any of these strings is received on the serial port, the ZyWAN attempts to connect to the first configured IP address of this Host Connection row.
Connect Message	Enter a text message sent to the network and/or serial port when a network connection is established to the remote address. This text is only sent when the *Echo Connect Strings?* is set to something other than *Neither*. This options emulates a modem's option to echo a connect message to a dialling computer. This field may be left blank if no message is desired.
Failure Message	Enter a text message sent to the network and/or serial port when the Terminal Client disconnects from a network connection, and to the serial port when a connection attempt fails. This text is only sent when the *Echo Connect Strings?* is set to something other than *Neither*. This option emulates a modem's option to echo a fail message to a dialling computer. This field may be left blank if no message is desired.
IP Address 1, *IP Address 2,* *IP Address 3*	Enter the IP address or fully qualified domain name (FQDN) for the Terminal Client to connect to.

Terminal Servers

The *Terminal Servers* tab looks like this:



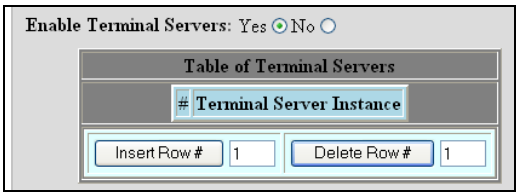
The various items must be configured in order to set up Terminal Server services. The Terminal Server sets up a listening port for inbound TCP/IP connection, allowing communication directly to a local serial port.

After setting all the Terminal Server properties, click the **Submit New Configuration** button before switching to a new tab or closing the window.

Changes made to the *Terminal Server* page take effect immediately after submitting changes, without requiring a reboot.

Enable Terminal Servers

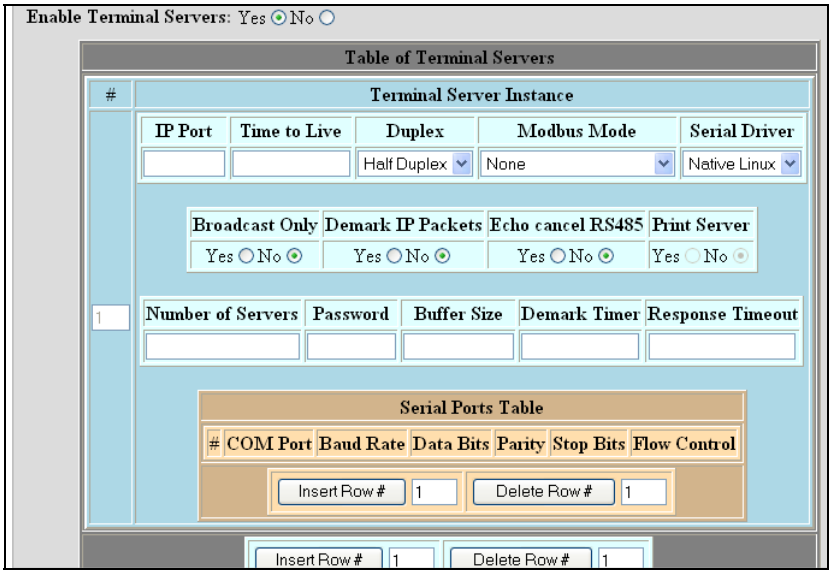
To allow one or more Terminal Server services to be configured, set *Enable Terminal Servers* to *Yes*. This makes the following items available in the *Table of Terminal Servers*:



The following buttons are available:

Button	Explanation
Insert Row#	Each of the Terminal Servers exists as a large set of properties in a numbered table row. In order to insert a row in the table, enter a number in the box between 1 and one greater than the highest number of rows. Then click the **Insert Row#** button to insert a blank row. This row must be filled in with all data required.
Delete Row#	In order to delete a Terminal Server configuration (a row in the table), enter a number in the box between 1 and the highest number of rows. Then click the **Delete Row#** button to delete the row. Once a row is deleted, it cannot be restored without inserting a row and entering the data again.

The *Table of Terminal Servers* looks like this:



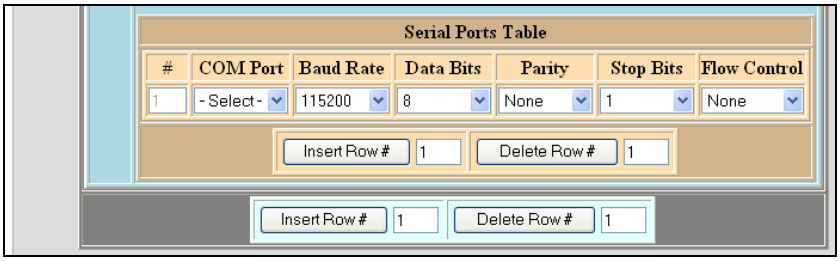
The following fields and options are available and must be set for each configured Terminal Server configuration:

Field/Option	Explanation
IP Port	Enter the IP port number (between 1 and 65535) to be used on the ZyWAN for incoming TCP/IP connections from a network client application. The IP address to which the client connects may be any valid address configured for the ZyWAN on any interface.
Time to Live	Enter the Time To Live for the connection (in seconds). This is the maximum time of no activity from the network-connected client, before the ZyWAN closes the Terminal Server connection.
Duplex	Select the duplex mode for the Terminal Server. This selects a mode of operation for handling bi-directional communication with a serial device. *Half Duplex*: This mode is designed for simple request-response networks, especially where serial port sharing with another Terminal Server may be required. After a request is received from the network and sent to the serial port, one response is expected. After the serial port times out or after one response is received and returned to the network client, the Terminal Server does not read any more serial data until the next request.

Field/Option	Explanation
	Full Duplex: This mode is designed for unsolicited data from serial devices, full bi-directional communication, or any serial protocol which may send large or multiple responses to a request. In this mode, the Terminal Server constantly receives data on both the serial and network ports, as long as a client is connected to the IP Port.
Modbus Mode	Select the mode of operation, if Modbus protocol translation is required. Options available are: *None*: This is the normal option for most applications. *Open Modbus to ASCII*: Converts Open Modbus/IP protocol requests to serial Modbus ASCII protocol, and converts the ASCII response to an Open Modbus/IP response. *Open Modbus to RTU*: Converts Open Modbus/IP protocol requests to serial Modbus RTU (Binary) protocol, and converts the RTU response to an Open Modbus/IP response.
Serial Driver	Select whether to use the Native Linux (ttyS) serial driver, or the Eurotech Ltd driver which allows for half-duplex RS-485 communication. Presently the Eurotech Ltd driver is not available.
Broadcast Only	Select *Yes* to only send to the serial port. This option allows the network computer to send data to the serial port without waiting for a response. The *Response Timeout* and *Duplex* mode are ignored.
Demark IP Packets	If a large network packet is sent to the ZyWAN and gets broken up over the network, the fragments can sometimes arrive at slightly different times. Each packet is sent to the serial port, but if the time difference is too great, the serial device may not react properly. Set this value to *Yes* to allow delayed IP packets to be put together before sending to the serial port. The value for *Demark Timer* is used to specify the time to wait for additional IP data. Set this value to *No* if this feature is not needed.
Echo Cancel RS-485	This option is used when the internal (COM3) or an external RS-485 converter is used in half-duplex mode. Set this option to *Yes* to block the reception of echo bytes on the serial port which get echoed back from the RS-485 device.

Field/Option	Explanation
Print Server	This option is used when the Terminal Server is used as a print server to a serial printer. Setting this option to *Yes* causes the Terminal Server to operate in *Print Server* mode. The Terminal Server absorbs as much IP data as it can within the available memory and send data to the serial port until it is all delivered, regardless of whether the host disconnects. When this option is set to *No* (default mode), if a host disconnects and data is still in the Terminal Server buffer, the data is discarded and not sent to the serial port.
Number of Servers	Enter the number of simultaneous clients which can connect to this Terminal Server simultaneously. Values must be between 1 and 8. If this is set to 1, the Terminal Server is *pre-emptive* -- this means that if a second client connects to the port, an already-connected client is disconnected. With *Number of Servers* greater than 2, any further connections are blocked when the number of simultaneous connections have been made.
Password	Enter a non-blank field as a password for the Terminal Server, if desired. The password must be no longer than 15 characters. When this is set, making a connection to the Terminal Server port returns a prompt for 'Password'. If the correct password (case-sensitive) is not entered within a minute, the connection is dropped.
Buffer Size	Enter the maximum number of bytes (between 1 and 4095) which are allowed in a response to a network client. (The actual number of bytes sent may be less if the *Demark* timer times out before the serial buffer is full.)
Demark Timer	Enter the maximum time (in milliseconds, between 10 and 30000) the ZyWAN waits for inactivity on the serial port before sending a response to the network client, if at least one byte has been received.
Response Timeout	This option only applies if the Duplex option is set to *Half Duplex*. Otherwise, this field is ignored. Enter the *Response Timeout* (in milliseconds, between 10 and 30000). For simple request-response networks (half-duplex), the request from a network client is sent to the serial port. If no serial response is received within the *Response Timeout*, the Terminal Server does not read any more serial data until the next request and the serial port is released.

The *Serial Ports Table* is part of the Terminal Server configuration. At least one row must be configured in the *Serial Ports Table* for it to work properly:



The following buttons are available:

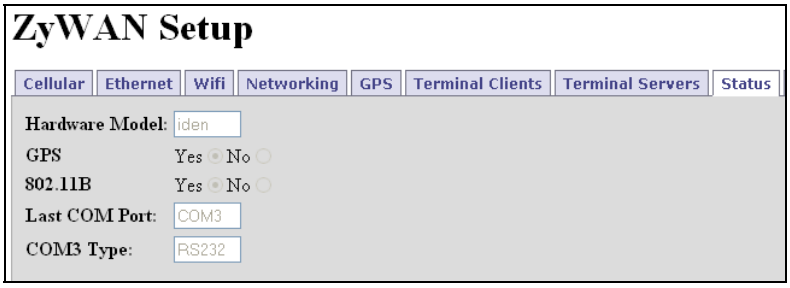
Button	Explanation
Insert Row#	Each row of the ***Serial Ports Table*** contains the definition of a serial port to use for this Terminal Server configuration. One Terminal Server may send data received from the network client to multiple serial ports simultaneously. In order to insert a row in the table, enter a number in the box between 1 and one greater than the highest number of rows. Then click the **Insert Row#** button to insert a blank row. This row must be filled in with all data required. Note that when adding or deleting rows of a Serial Ports Table, make sure to click the **Insert Row#** or **Delete Row#** buttons within the brown section of the Serial Ports Table, not the buttons at the very bottom of the main table.
Delete Row#	In order to delete a row of the *Serial Ports Table*, enter a number in the box between 1 and the highest number of rows. Then click the **Delete Row#** button to delete the row. Once a row is deleted, it cannot be restored without inserting a row and entering the data again.

The following options are available for the *Serial Ports Table*. At least one row of the *Serial Ports Table* is required for the Terminal Server to operate.

Field/Option	Explanation
COM Port	Select the serial COM port to which the Terminal Server data is sent. Make sure this COM port is not configured for another service in the ZyWAN. Otherwise, both services may conflict for the port and not operate correctly. It is possible in some applications to configure two Terminal Servers to use the same COM port. In order for this to work, the *Demark* option must be set to *Half Duplex* or Broadcast. In *Half Duplex* mode, the clients connecting to each port may need to wait much longer for a response, since the *Demark* and *Response Timeout* times for all connections are observed, in the order that the requests are received from each client.
Baud Rate	Select the baud rate to use for the Terminal Server port. Baud rate options range from 1200 to 115,200 bps.
Data Bits	Select the number of data bits to use for the Terminal Server port. Options are *5*, *6*, *7* and *8*.
Parity	Select the parity to use for the Terminal Server port. Options are *None*, *Odd*, *Even*, *Mark*, *Space*.
Stop Bits	Select the number of stop bits to use for the Terminal Server port. Options are *1*, *1.5* and *2*.
Flow Control	Select whether to use hardware flow control for the Terminal Server port. Options are *None* and *RTS/CTS* (hardware flow control).

Status

The *Status* tab looks like this:



The *Status* tab includes several items which give the current status and hardware configuration. The hardware configuration is done in factory configuration and is provided here for information. See ZyWAN model numbers, page 9, for information on the ZyWAN model numbers based on hardware configuration.

The screen offers the following fields and options:

Field/Option	Explanation
Hardware Model	The *Hardware Model* gives the type of cellular modem installed. Options are indicated as: *gprs*, *iden* and *evdo*.
EVDO Provider	Since the EvDO cellular provider has to be specified with the modem provided with the ZyWAN, this is set as part of the factory configuration (applies only to ZyWAN-EVDO models). Options for EvDO provider are: *Sprint*.
GPS	This option indicates whether or not GPS hardware is installed.
802.11B	This option indicates whether or not an 802.11b WiFi module is installed.
Last COM Port	This option indicates what is the last available COM port on the ZyWAN, which is used in all other configuration menus where a selection of COM ports is allowed. Typically this is *COM3*.
COM3 Type	The COM3 port may be factory configured to be either RS-232 or RS-485/422. Options are indicated as: *RS-232* or *RS-485*.

Update

The *Update* tab provides an option to update the ZyWAN firmware to a later version.

Update URL

Enter the network address URL (Uniform Resource Locator) from which an update file may be downloaded. The address must be accessible through one of the configured network interfaces of the ZyWAN. When the **Update Zywan** button is pressed, the file is downloaded, installed and the ZyWAN reboots if necessary.

Appendix A - Contacting Eurotech

Eurotech sales

Eurotech's sales team is always available to assist you in choosing the board that best meets your requirements.

Eurotech Ltd
3 Clifton Court
Cambridge
CB1 7BN
UK

Tel: +44 (0)1223 403410
Fax: +44 (0)1223 410457
Email: sales@eurotech-ltd.co.uk

Comprehensive information about our products is also available at our web site: www.eurotech-ltd.co.uk.

While Eurotech's sales team can assist you in making your decision, the final choice of boards or systems is solely and wholly the responsibility of the buyer. Eurotech's entire liability in respect of the boards or systems is as set out in Eurotech's standard terms and conditions of sale. If you intend to write your own low level software, you can start with the source code on the disk supplied. This is example code only to illustrate use on Eurotech's products. It has not been commercially tested. No warranty is made in respect of this code and Eurotech shall incur no liability whatsoever or howsoever arising from any use made of the code.

Eurotech technical support

Eurotech has a team of dedicated technical support engineers available to provide a quick response to your technical queries.

Tel: +44 (0)1223 412428
Fax: +44 (0)1223 410457
Email: support@eurotech-ltd.co.uk

Eurotech Group

Eurotech Ltd is a subsidiary of Eurotech Group. For further details see www.eurotech.com

Appendix B - Technical specifications

ZyWAN base unit

General

Processor/clock:	520MHz PXA270 processor.
Dimensions:	238.5mm (9.4”) x 141mm (5.6”) x 65mm (2.6”).
Weight:	1.25 kg (2.75 lbs).
Mounting:	Panel mount.
Memory:	64Mbytes SDRAM and 32Mbytes Flash.
Serial ports:	(2) RS-232 and (1) optional RS-232 or RS-422/485.
LAN:	(2) RJ45 10/100baseT.
USB	(2) USB 1.1 ports (one or both used internally on some models)
Wireless WAN:	GSM, IDEN or EVDO cellular data network (depending on product model) 802.11b option.

Power

Input power:	10 - 30V DC.
Overvoltage/reverse voltage protection:	100V DC.
Ignition sense input:	12V DC protected.
Power consumption:	2 W (excluding 802.11b, cellular and other peripheral devices). 5 W (approximate, including 802.11b and cellular) Power consumption for communication devices varies depending on the amount of transmission time. Typical values for maximum power consumption are listed below (assuming full transmit power over a sustained period). Realistically, the total power consumption is much less, because the module does not transmit continuously. GSM (GR64) cellular module: 7.5 W (max) IDEN (iO270) cellular module: 4.8 W (max) GPRS (MC5725) cellular module: 6.6 W (max) 802.11b (PN18) module: 2 W (max)

Environmental

Humidity:	10% to 90% relative humidity (non-condensing)
Temperature:	Without 802.11b: Operating: -20 to +70 C (up to +60 C with IDEN) Storage: -40 to +85 C With 802.11b (PN18): Operating: 0 to +60 C Storage: -20 to +70 C

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